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THE MONTH

THE 'Peptic ulcer problem', the subject of our symposium this month, is one of the most baffling in the whole field of medicine. In spite of its high incidence, and in spite of much intensive research, we are still ignorant of its cause. As Dr. Howat, himself a leading worker in this field, points out in his introductory article on 'The etiology of peptic ulcer': 'The fundamental fault which in man so commonly leads to these characteristic lesions of the stomach and duodenum is not known, but an imbalance has been postulated between potentially destructive agents present in gastric secretions, notably hydrochloric acid and pepsin, and local protective factors which confer immunity to digestion on normal upper intestinal mucous membrane'. In view of Dr. Susser's evidence, in his article on 'Environmental factors and peptic ulcer', of 'a recession of the gastric and duodenal ulcer syndromes', the intriguing question inevitably arises of whether in time peptic ulcer will follow chlorosis into the limbo of the past—undiagnosed and unsung. Be that as it may, there is much that the practitioner can do to alleviate, if not cure, the condition, and two of the greatest advances in this field are the simplification of the medical treatment, and the more conservative use of the surgical treatment, of the condition.

The Symposium

WHEN will the tobacco manufacturers realize that by their efforts to stimulate the smoking of cigarettes they are doing the nation a disservice and threatening so to interfere with the health of the nation that Parliament may be required to take action in the matter? One does not need to be an alarmist, a faddist, or a kill-joy to be disturbed at the way things are developing. Whatever may be the final verdict on the role that cigarette smoking plays in the genesis of carcinoma of the lung, there is unanimous agreement in the medical profession that heavy smoking is bad for health. It affects the cardiovascular, respiratory and digestive systems. The recent emphasis on the association with malignant disease has, unfortunately, distracted attention from the other deleterious effects of cigarette smoking. How many chronic bronchitics, for instance, realize that, as Dr. James Laurie pointed out in our December 1960 issue (*The Practitioner*, 1960, **185**, 722), 'severe bronchitis is seldom found in one who has never smoked'.

Cigarettes or Health ?

In spite of this overwhelming evidence of the dangers of smoking, the tobacco industry almost doubled its advertising expenditure last year, and in the first nine months of the year spent £2.2 million on advertising. Their future plans are even more ominous. According to the financial pages

of a recent issue of *The Times* (January 16, 1961): 'The years 1962 and 1963 seem to be particularly full of promise, other things being equal. In these two years the large crop of post-war babies will be reaching the age of persuasion. Teenagers already form a sizeable portion of the industry's sales, and it is noticeable that the manufacturers' advertising campaigns are tending to be directed towards this section of the population'. If this is the case, then what is the use of doctors, schoolteachers and social workers doing their utmost to prevent children acquiring this habit? What the tobacco companies and their shareholders have got to realize is that far too many people are smoking far too many cigarettes. Their frantic attempts to encourage this process are becoming anti-social; if they are not voluntarily curtailed, then Parliament will need to intervene. We have now reached the position where the shareholders of the tobacco industry cannot be allowed to wax fat at the expense of the health of the rising generation. Compulsion is odious but, if people persist in being anti-social, there is no alternative. Unless the tobacco industry rapidly shows a greater sense of responsibility to the community, Parliament will have no alternative but to act—say, by doubling the duty.

The Challenge of Leprosy

LEPROSY is not a highly contagious disease, we have the knowledge to control and prevent it, and there is no reason why it should not be tackled along the same lines as we are tackling tuberculosis and malaria. These are the simple facts about leprosy, as admirably brought out by Dr. R. G. Cochrane, probably the senior active leprologist in the world, in the new edition of his stimulating booklet 'Leprosy; Its Challenge and Hope' (The Mission to Lepers, price 1*s.*; 1*s.* 4*d.* post free). In spite of this the old tradition dies hard that it is a dread disease, and its victims are still referred to as 'lepers' in the mistaken belief that this Biblical term referred only to patients with leprosy. As Dr. Cochrane points out, 'there is no more justification for calling those who suffer from leprosy "lepers" than calling those who are mentally ill "lunatics" '.

This is not merely a question of playing with words. It is fundamental to the whole modern approach to the problem of leprosy. Unless the unfortunate victims of the disease themselves, their relatives and the general public can be brought to look upon leprosy in the same way as they look upon any other disease due to infection, leprosy will never be brought under control. The spectre of 'the leper' must be banished once and for all from our midst. Actually much has already been achieved in this respect. It was therefore with something akin to horror that leprologists read Mr. Graham Greene's latest novel, 'A Burnt-out Case'. This is such a travesty of the disease and modern methods of treatment that it can do nothing but harm. Novels may be works of fiction but it is verging on the unpardonable for a writer of the standing of Mr. Graham Greene to present such a distorted picture as this in order, presumably, to enhance the

dramatic value of his work. This, his latest, novel may well turn out to be a best-seller, but in achieving this perfectly laudable (and lucrative) ambition he has done a gross disservice to the fight against leprosy.

Loss of Consciousness

How common is loss of consciousness among healthy people? The surprising answer, according to L. E. Lamb and his colleagues of the United States Air Force (*Aerospace Medicine*, 1960, **31**, 975) is that more than one healthy citizen in every three has had one or more bouts of loss of consciousness. At least this seems a reasonable deduction from their finding that loss of consciousness had occurred in 37.4 per cent. of 1,980 members of the U.S. Air Force population. If cases due to physical trauma, such as accidents, were excluded, this still left 20.2 per cent. of the men who had had bouts of loss of consciousness or syncope. Even more interesting is the fact that this survey 'established that many pilots have had successful flying careers although they have in fact experienced loss of consciousness precipitated by innumerable causes'.

Some detailed figures from one part of the survey—that covering 1,033 flying personnel—illustrate many interesting facets of this problem. Trauma and acute illness were the two commonest causes, being responsible for 25 per cent. and 4.1 per cent., respectively, of the incidents. Third in the list came 'shots' or inoculations and venepuncture which accounted for 35 (3.4 per cent.) of the episodes. Alcohol was responsible in 30 cases, and psychic factors accounted for loss of consciousness in 15 individuals. In all but three instances, the factor in question was associated in some way with the sight of blood: e.g. 'observed aircraft crash, and fainted at the sight of the injured pilot'. There were six individuals who had episodes of loss of consciousness while attending church, and in four of these the only reported episode was attributed to such an event. Examples in this category were: 'acting as an altar boy'; 'kneeling at the altar'; 'standing up to sing'. In another six, hypoxia associated with flying was given as the cause. It would be interesting to know how this air-force incidence compares with the experience of general practitioners.

The Graham Steell Murmur

In these scientific days when eponyms are frowned upon, it may well be that relatively few tears will be shed over the demise of the Graham Steell murmur. This, it will be recalled, was a soft blowing diastolic murmur heard along the left sternal border in patients with mitral stenosis, and attributed to pulmonary incompetence resulting from pulmonary hypertension. Its incidence often seemed to be in inverse proportion to the frequency with which it cropped up in the vivas of the final examination. Now A. N. Brest and his colleagues, of Philadelphia (*New Engl. J. Med.*, 1960, **263**, 1229), have come along with an impressive array of evidence to demonstrate that the 'Graham Steell murmur' is a figment of the

imagination. Its presence denotes an adynamic aortic incompetence.

Ten patients with mitral stenosis had what could be legitimately described as a Graham Steell murmur—an early diastolic murmur along the left sternal border, but no clinical evidence of what they describe as 'dynamic aortic insufficiency': i.e. the diastolic blood pressure was greater than 60 mm. Hg, and the peripheral pulses were normal. Retrograde catheter aortography, however, revealed 'a + (minor) aortic regurgitation' in the four patients in whom it was performed, whilst in all of seven patients on whom a mitral commisurotomy was performed, 'a diastolic thrill could not be palpated over the outflow tract, this indicating the absence of any significant pulmonary regurgitation', whilst 'a diastolic thrill was palpable over the septal leaflet of the mitral valve . . . thereby indicating the presence of insufficiency of the aortic valve'. Definite though all this may be, the authors close on a note of caution: 'This study does not negate the possibility that occasional patients with mitral stenosis have an accompanying pulmonary regurgitation secondary to pulmonary hypertension'.

Air-Borne Invalids

One of the many services provided by the British Overseas Airways Corporation is that undertaken by its admirable medical department in advising doctors about the transport of invalids by air. As Dr. K. G. Bergin, the Corporation's Director of Personnel and Medical Services, points out in a recently published pamphlet, 'The Transport of Invalids by Air', 'the advent of fast and comfortable pressurized aircraft, powered by turbine engines and flying high above the weather, has made air travel the preferred method of transporting almost all categories of invalids over medium and long distances'. Not only is it the most desirable method of transport, in many cases it may be life-saving.

The increasing extent to which it is being used is shown by some figures quoted by Dr. Bergin. In 1959, B.O.A.C. alone carried approximately 4000 invalids, which represents slightly less that 1 per cent. of all passengers. Even more significant is the fact that of the inquiries received concerning the carriage of invalids, only around 2 per cent. of cases were not accepted for air travel on medical or associated grounds. The services provided by B.O.A.C., when required, include the attendance of doctors or the administration of drugs en route, the provision of certain items of medical equipment and oxygen sets, nursing facilities, and ambulance services at the departure and arrival airports. Full details of the indications, and contra-indications, to air travel by invalids are supplied in Dr. Bergin's pamphlet, copies of which can be obtained, free of charge, on application to: Director of Personnel and Medical Services, British Overseas Airways Corporation, London Airport, Hounslow, Middlesex. Practitioners would be well advised to avail themselves of the opportunity of obtaining authoritative advice on a problem with which they may be faced at any time during the course of their work.

THE ETIOLOGY OF PEPTIC ULCER

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THE term, peptic ulcer, does not bear an etiological connotation; it is used simply in a generic sense to denote those ulcers which form in the upper segments of the alimentary tract to which gastric secretions have access. The fundamental fault which in man so commonly leads to these characteristic lesions of the stomach and duodenum is not known, but an imbalance has been postulated between potentially destructive agents present in the gastric secretions, notably hydrochloric acid and pepsin, and local protective factors which confer immunity to digestion on normal upper intestinal mucous membrane. In pyloric and duodenal ulcer destructive factors preponderate, in ulcer of the body of the stomach mucosal resistance is undermined. A review of the grounds for this hypothesis is not within the scope of this article, but it has been restated here as a generalization acceptable to most, against which a few of the recent clinical studies of peptic ulcer can be viewed in perspective.

NON-BETA-CELL TUMOURS OF THE PANCREAS

In 1955, Zollinger and Ellison drew attention to two of their patients and four others who had a characteristic triad of excessive acid secretion of the stomach, fulminating and intractable peptic ulceration and non-insulin-producing tumours of the pancreas. By 1960 more than eighty cases of this syndrome which now bears their names had been reported (Zollinger and Craig, 1960b). The symptoms are related to the high output of hydrochloric acid by the stomach (Zollinger and Craig, 1960a). The most common subjective symptom is epigastric burning only transiently relieved by alkali. If the course of the illness is short the symptoms are correspondingly devastating, often terminating in perforation or massive bleeding of the peptic ulcer; if of longer duration, diagnosis may be difficult since peptic ulceration is often located atypically in the œsophagus, in the distal duodenum and proximal jejunum, and it is only later that chronic perforation, internal fistula formation, duodenal and jejunal obstruction or recurring bleeding herald the fulminating progress of the ulceration. Giant gastric and duodenal rugæ (Menetrier's syndrome) may be a feature.

Sometimes these pancreatic tumours are associated with intractable diarrhœa even so severe as to lead to death from potassium depletion. In some of these fatal cases peptic ulceration may not occur; in others diarrhœa precedes the peptic ulceration by months. This watery diarrhœa is not due to the tumour itself but to irritation of the small bowel by the hydrochloric

acid. Inactivation of pancreatic lipase and trypsin in the duodenum may lead to bulky foul-smelling stools as in sprue. This steatorrhœa is cured by total gastrectomy (Summerskill, 1959).

The 12-hour nocturnal gastric secretion often exceeds a volume of 2 litres and a free acid content of 100 to 300 milli-equivalents compared with a normal volume of 400 ml. and 18 milli-equivalents of free acid. Intensive medical treatment, radical gastric surgery short of total gastrectomy, including both vagotomy and antrectomy, fail to protect the patients from the fulminating ulceration. The ulcerogenic tumours found in the pancreas vary in size. Over half of them are malignant and active metastases are present in the liver. In some 10 per cent. of patients diffuse adenomatosis of islet tissue is found in place of the more usual tumour. The parent islet cell of the tumour has not yet been identified with certainty, but it is not a *beta* cell.

AN ULCEROGENIC HORMONE

These tumours (analogous to functioning malignant carcinoid tumours of the intestine) secrete an ulcerogenic substance or hormone which passes through the liver and acts directly on parietal cells since neither vagotomy nor antrectomy has influenced the course of the disease. Recently, Gregory and his colleagues (1960) have succeeded in extracting from the pancreatic tumour of a single patient with the Zollinger-Ellison syndrome a substance chemically akin to gastrin which stimulates the production of hydrochloric acid but not pepsin in denervated gastric pouches of experimental animals.

The association of functioning non-*beta*-cell tumours of the islets is of wider interest than its comparative rarity would suggest. If the work of Gregory and his colleagues is confirmed, for the first time a clear mechanism by which peptic ulceration is produced has been demonstrated. The excessive production of hydrochloric acid is accompanied by marked hyperplasia of the gastric glands, which may extend as far as the pylorus. Few reports on pepsin output are available, but urinary pepsinogen output was elevated in the cases of Summerskill (1959) and of Donaldson and his colleagues (1957), in the former to 535 units per 24 hours (normal <150). Tumour extracts prepared by Gregory and Tracy's methods (1959) contained no pepsin stimulant, even though the acid-stimulating activity in the tumour was 33 times greater than that obtained from an equal weight of hog antral mucosa.

The question arises whether a normal physiological mechanism for acid secretion is present in normal pancreas. Some experimental observations suggest that it may be. Elman and Hartmann (1931) were able to produce duodenal ulceration just distal to the pylorus in dogs in which pancreatic juice was diverted by exterior drainage. Dragstedt (1942) established that total pancreatic fistula led to ulcer in almost 100 per cent. of dogs, duct ligation in 29 per cent. but total pancreatectomy in only 1.3 per cent. of dogs. This ameliorating effect of pancreatectomy has not hitherto been convincingly explained. Neither Keeton and Koch (1915) nor Gregory and

Tracy (1960) have been able to prepare extracts with gastrin-like properties from normal pancreas.

MULTIPLE ENDOCRINE ADENOMAS

In about 23 per cent. of cases, according to Zollinger (1960), multiple endocrine adenomatosis may be found in association with islet-cell hyperplasia. This recalls the cases of multiple endocrine adenomas described by Underdahl, Woolner and Black (1953), Moldawer and his colleagues (1954) and Kenney and his co-workers (1954), in which the pituitary, parathyroid glands and pancreatic islets, even sometimes the adrenal and thyroid glands, show evidence of adenomatous hyperplasia (Gray, 1960). In some of these cases, however, functioning insulin-producing tumours arising in the *beta* cells of the islets are found. Other associated features have been peptic ulceration in 35 per cent. of cases and the presence of giant gastric rugæ which may be associated with hypoproteinæmia. Wermer (1954) has produced strong evidence in one family in favour of the genetic determination of this polyglandular endocrine disorder. In our present state of knowledge it is best not to identify the Zollinger-Ellison syndrome with multiple endocrine adenomatosis, though there may be some overlap (Cooke *et al.*, 1960). Quite recently, Zollinger and Craig (1960b) have stated that a non-*beta*-cell adenoma of the islets was found in the 13 patients (of a total of 17 patients with both peptic ulcer and polyglandular syndrome) who were adequately investigated. As yet no hereditary predisposition to the Zollinger-Ellison syndrome is proposed.

PARATHYROID ADENOMA

Of the other endocrines, peptic ulcer has been considered to occur more commonly in patients with parathyroid adenoma and primary hyperparathyroidism. The evidence has been assembled by Kirsner (1958) and critically reviewed by Ostrow, Blanshard and Gray (1960) who found, in retrospect, that multiple endocrine adenomas were more common in patients with hyperparathyroidism in whom peptic ulcer has developed than in the group as a whole, and that hyperparathyroidism was not necessarily related etiologically to peptic ulcer. So far only one or two cases of non-*beta*-cell tumour of the islets have been uncovered in patients with parathyroid adenomas (Zollinger and Craig, 1960b) though careful search will no doubt reveal more. Apart from the syndrome of multiple endocrine adenomatosis a causal relationship between adrenal disease (Gray, 1960) or pituitary adenoma (Roth and Vilardell, 1960) and peptic ulcer has not been established.

EMPHYSEMA

Peptic ulcer is a relatively common disorder, and before a causal association with other diseases can be accepted, controlled studies of matching series correlating investigative procedures as well as sex and age, perhaps social status, racial and geographical factors, and even smoking habits, may be

necessary. The fallacies inherent in studies of both the clinical and post-mortem incidence of peptic ulcer have been indicated by Ivy and his colleagues (1950), Doll and his co-workers (1951), and Watkinson (1960).

Various workers have reported an increased incidence of peptic ulceration varying from 19 to 33 per cent. in advanced pulmonary emphysema and cor pulmonale. Many of these ulcers are acute ulcers which are found also in patients dying of non-pulmonary cardiac failure. A carefully controlled study (Platts, 1960) has revealed that there is no increase in chronic peptic ulcer in patients with cor pulmonale, when compared with matching groups suffering from other types of heart disease or no heart disease. No evidence was found to support the hypothesis that chronic respiratory acidosis causes an increased output of gastric acid.

CIRRHOSIS OF THE LIVER

Lack of suitable control groups also makes it difficult to assess whether patients with cirrhosis of the liver are more prone to develop peptic ulceration. Cases have been reported of intractable peptic ulcer developing or becoming reactivated after portacaval shunt. Clarke (1960) has reviewed these reports and the experimental evidence of increased gastric secretion which follows a by-pass of portal blood round instead of through the liver. It appears that in health a humoral substance is absorbed from the bowel and transported to the liver where it is activated. This agent which is increased after the consumption of meat may be free histamine liberated from the histidine in meat by bacterial decomposition in the gut (Irvine, Duthie and Waton, 1959; Irvine *et al.*, 1959).

Paradoxically, low values of both basal and histamine-induced gastric output of acid, low blood pepsinogen and uropepsin excretion have been found in patients with hepatic cirrhosis. Gastric acid output, both basal and after stimulation with histamine, was higher in cirrhotics with portacaval anastomosis than in cirrhotics with no shunt, the amount being comparable with normal levels. As Clarke suggests, studies after meat meals in man might yield evidence of gastric hypersecretion.

DUODENAL ULCER AND HYPERSECRETION

It is of value to examine what light the Zollinger-Ellison syndrome throws on our present ideas of the etiology of peptic ulcer. At first it must be recognized that ulceration which is part of this syndrome is rare and atypical, not only in its devastating severity but in its predilection to be located in the distal duodenum or upper jejunum. This may result from undue sensitivity of these sites to the excessive acidity, so much greater than is even encountered following gastro-jejunostomy, and may indicate a gradient of liability to digestion of the intestinal tract in man as in animals, in which susceptibility of the mucosa to damage by acid increased as did the distance from the pylorus (Mann and Bollman, 1932; Florey and Harding, 1934).

In man the proximal duodenum and pyloric antrum are the common sites of ulcer formation. Hypersecretion of acid is an important factor in producing this type of ulcer. The mean basal and nocturnal acidity and the mean pH in the stomach and proximal duodenum under fasting conditions and after food are higher in duodenal ulcer than in normal individuals (James and Pickering, 1949; Atkinson and Henley, 1955). About half the patients with duodenal ulcer studied by Ihre (1939) had a higher output of acid in response to insulin and histamine than normal. Hunt and Kay (1954) found that the mean high rate of basal secretion of acid in proportion to the response to histamine was little more than the corresponding proportion in a normal group, which suggested that the hypersecretion of duodenal-ulcer patients could therefore well be accounted for by an increase in parietal secretory capacity and it was unnecessary to postulate an increased excitation of parietal cells. Sircus (1960), however, found in male patients with duodenal ulcer that as the basal rate of secretion rose it formed an increasing proportion of the maximal capacity to secrete. This implies that, as well as an increased capacity to secrete, the high rates of basal secretion might be associated with increased stimulation.

Kay (1953), who used an antihistamine drug, mepyramine maleate, to counteract the systemic effects of histamine, showed that the mean maximal secretory response obtained by this 'augmented histamine test' was greater in patients with duodenal ulcer than in normal patients and patients with gastric ulcer. Recently, using a modified 'augmented histamine test' in patients before and after gastric resection for duodenal ulcer, Card and Marks (1960) proved a highly significant correlation between the numbers of parietal cells and the estimated maximum acid output of the resected portion of the stomach. This work is in keeping with the previously reported studies of Cox (1952), that the volume of acid-secreting mucosa and the number of parietal cells of the whole stomach at necropsy was greater than normal in patients with duodenal ulcer, and of Tongen (1950) who proved a correlation between gastric acidity and the concentration of parietal cells per unit area in human stomachs. Tongen further showed that persistent stimulation of gastric acid secretion in dogs by histamine in beeswax caused a marked hyperplasia of the parietal cells. Similar results in guinea-pigs (Cox and Barnes, 1945) have not been fully confirmed by Marks (1957).

The hypersecretion associated with some duodenal ulcers has been attributed to excessive vagal stimulation (Dragstedt, 1956) since vagotomy will abolish this hypersecretion, and this, in turn, has been related to the influence of psychogenic factors. Experimental attempts to induce peptic ulceration by prolonged vagal stimulation have not been particularly successful (Heslop *et al.*, 1953), and the verdict on the validity of the hypothesis must be not proven. It may not be a simple problem of cause and effect since vagotomy reduces both the spontaneous and augmented histamine response in man (Gillespie *et al.*, 1960). Recently, Pe Thein and Schofield (1959) have provided convincing evidence that the vagus nerve is

concerned in the release of gastrin from the antrum in dogs. This is a direct vagal effect on the antral mucosa and not secondary to an action on antral musculature (Nyhus *et al.*, 1960). The physiological role of the vago-antral mechanism is as yet uncertain (Schofield, 1960).

INHIBITORY MECHANISMS

Inhibitory mechanisms are present, both in the antrum and in the duodenum, which are thought to regulate the acidity of gastric contents. Close study of antral inhibition followed reports that the Finsterer or antrum exclusion operation for peptic ulcer, in which the antrum was preserved in continuity with the duodenum, often led to the development of anastomotic ulcer (Ogilvie, 1938). Alkalinization of the antrum (from duodenal reflux) leads to the secretion of acid by the stomach, and acidification (to a pH of 1.5 or less) terminates the gastric secretory phase apparently through an inhibition of the gastric mechanism (Woodward and Dragstedt, 1960). The first part of the duodenum also is a pH regulator of gastric contents (Code and Watkinson, 1955). Again, when the pH reaches 1.5 or less, both acid secretion and motility of the stomach are diminished. Hunt (1957) has studied this acid inhibition in the duodenum in patients with duodenal ulcer. Only six of 16 ulcer patients showed faulty secretory inhibition when acid was placed in the duodenum; the others showed normal inhibition. In none was inhibition of motility impaired.

PEPSIN AND DUODENAL ULCERATION

The volume and acidity of gastric contents is affected not only by the secretion of the parietal cell mass, but also by the secretions of the non-parietal glands, by the buffering effect of saliva and food and the neutralizing action of regurgitated bile and pancreatic secretion. Although the non-parietal component can be assessed in man, little is known of changes in peptic ulceration. Patients with duodenal ulcer secrete more pepsin than do normal subjects or patients with gastric ulceration (Hirschowitz, 1957). About half the patients with duodenal ulcer studied by Grossman (1960) had raised pepsin output. The mean levels of plasma pepsinogen and uropepsin are also increased in duodenal ulcer, although there is considerable overlap with normal individuals. Plasma pepsinogen concentrations are unaffected by digestion and are increased when peptic cells are damaged. If it can be assumed that peptic cells undergo destruction at a constant rate, plasma pepsinogen may be related to, and possibly a measure of, peptic cell mass. Hirschowitz rightly emphasizes that this theory requires experimental proof. The implication of pepsin as an etiological factor rests largely on experimental evidence (Schiffrin, 1940; Schiffrin and Warren, 1942), but this is largely an academic problem, since peptic activity cannot be divorced from gastric acidity. In this regard it is worthy of note that some proteolytic activity is present in the gastric secretions of duodenal-ulcer patients when the pH is as high as 3.8 (Taylor, 1959).

GASTRIC MOTILITY

Gastric motility has been less exhaustively studied in duodenal ulcer than gastric secretion, in spite of the common belief of radiologists that hypertonicity and hyperperistalsis accompany duodenal ulcer, whilst hypotonia and hypomotility are more likely to be found in association with gastric ulcer. Hunt (1957) was unable to demonstrate any convincing evidence of abnormal gastric emptying in duodenal ulcer in response to saline, glucose or acid test meals, although Smith and his colleagues (1957) found that during evacuation of an acid-barium meal, gastric activity was greater in patients with duodenal ulcer than in normal subjects, especially in those who were subject to ulcer pain. Rowlands (1960) considers that present-day techniques are not sufficiently refined to assess minor abnormalities of gastric motility.

GASTRIC ULCER

In gastric ulcer, as in a proportion of duodenal ulcers, the amount of acid may be normal or even low. In these cases some other factor producing ulceration must be sought. Impaired tissue resistance has long been considered to be important, but the study of this factor is hampered by poor experimental, physical and chemical methods. The concept of Hollander (1954) is of a two-phase mucous barrier, the outer layer being of mucus, the inner being the subjacent columnar and cuboidal cells lining the surface and the crypts. The constituents, the physico-chemical properties, origin and physiological significance of gastric mucus have been reviewed by Jerzy Glass (1953). More recently, Heatley (1959) has described his conception of a dynamically maintained barrier of mucosubstance in the antrum of the pig. Mucus possesses anti-peptic activity (Babkin and Komarov, 1932; Komarov, 1936), but Hunt (1948) was unable to find evidence of a pepsin activity inhibitor in aspirated gastric contents. Other sulphate-containing polysaccharides share this capacity to inhibit pepsin, such as heparin and chondroitin sulphate (Levey and Sheinfeld, 1954), and carageenin (Houck *et al.*, 1960). Gastric mucoprotein is increased in response to insulin in some patients with duodenal ulcer (Jerzy Glass and Boyd, 1950). Most impressive are the direct observations of the mucous layer of the stomach made by Wolf and Wolff (1943) who have given an excellent description of how the mucous layer adhered to the mucosa of the stomach of their subject, Tom, who had a gastric fistula. When the pH of the stomach contents was less than 2, the pH of the mucosal surface of the stomach under this protective mucus lay between 4 and 7. The mucous layer was elaborated in response to both physical and chemical stimuli, protecting the mucous membrane from significant injury. Contact with acid of an area denuded of mucus led to the formation of peptic ulceration within four days. During this period the rate of acid secretion was increased. Suggestions have recently been made that one factor in steroid ulceration may be lowering of the mucous defence barrier (Hirschowitz *et al.*, 1955; Janowitz *et al.*, 1958; Segal, 1960).

Amongst others, Dragstedt (1956) and Johnson (1955, 1957) have stressed the factor of stasis in the etiology of ulcers of the body of the stomach. The hypomotility and hypotonicity of the stomach in gastric ulcer is often seen by radiologists, with barium pooling in the dependent segment of the stomach. Johnson has suggested that prolongation of contact of hydrochloric acid on the gastric mucosa consequent on stasis may be an important factor in overcoming the mucous barrier to produce a gastric ulcer.

SUMMARY

Current thought on the mechanisms which induce peptic ulcer has been reviewed in the light of recent knowledge obtained from a study of the Zollinger-Ellison syndrome, in which prolonged and excessive stimulation of the parietal cell by a hormonal substance leads to gross hypertrophy of the parietal cell mass, hypersecretion of acid and ulcer. As yet there is no direct evidence that this mechanism operates to produce other types of peptic ulcer in man. Although most attention has been focused on a quantitative imbalance between aggressive and defensive factors in the etiology of ulcer, a time factor may be equally important. In duodenal ulcer hypersecretion throughout day and night, and in gastric ulcer hypomotility of the stomach, may lead to prolonged contact of the mucosa with the injurious acid-pepsin chyme.

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ENVIRONMENTAL FACTORS AND PEPTIC ULCER

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In peptic ulcer, knowledge of environmental factors is far from precise. To study these factors, it is essential first to measure the occurrence of a disease in different environments. This is a complicated task in most chronic diseases and particularly in peptic ulcer, where the several available measures often yield divergent results, since each is measuring something different.

Surveys of sickness to discover dyspeptic symptoms in the population at large are the most reliable guide, but they are expensive and difficult. Surveys of the smaller group of patients who complain to doctors of dyspepsia will give a result affected by those social and personal influences which cause a patient to bring his complaint to the doctor. The still smaller group for whom a definite diagnosis is reached in hospital through radiology, gastroscopy and complications such as hæmatemesis and perforation will give yet another result. Even these events may not be representative of all ulcers: in Uganda, for instance, where few ulcers are discovered clinically, or through complications, necropsy reveals a rate similar to that found in Britain (Raper, 1958). Death rates also present difficulties, the first of which is that many ulcers do not cause death. Deaths from peptic ulcer, even if accurately certified, reflect an accumulation of a chronic process as the fatality rate increases towards the end of the life span. Death is not an even risk throughout the duration of illness. If after death ulcers are counted from the scars the pathologist sees at necropsy, and not from death certificates, the problem is to interpret correctly the history in life which the scars represent, and to allow for those ulcers that do not leave scars. Finally, statistical reports often fail to distinguish between gastric and duodenal ulcer, and there is much to suggest that these are separate although related entities, because prevalence by age, sex, social class and over time, as well as acidity in the stomach, are all divergent.

PREVALENCE AND INCIDENCE

Peptic ulcer is responsible for a large volume of chronic disability—it accounts for about one-tenth of hospital admissions. Probably 1,500,000 or more persons in Britain have experienced peptic ulcer. In London the prevalence—that is, all known cases at any one point in time—is at least 6 per cent. among men between 14 and 64, and at least 2 per cent. among women (Doll, Jones and Buckatzsch, 1951). A somewhat higher rate was revealed by a national necropsy survey (Watkinson, 1958). In York a study of incidence—that is, all new cases over a period of time—showed that there

0.3 per cent. of men and 0.1 per cent. of women are likely to develop an ulcer each year (Pulvertaft, 1959).

In Britain and North-West Europe the major part of sickness from peptic ulcer is caused by duodenal ulcer, although gastric ulcer causes as many deaths as duodenal ulcer.

AGE AND SEX

All ulcers, but particularly duodenal ulcers, are much commoner in men than in women. The disparity between the sexes tends to be much smaller after the menopause (Knutsen and Selvaag, 1947; Doll, Jones and Buckatzsch, 1951; Watkinson, 1958), which supports the suggestion that endocrine factors may protect against the development of ulcers (Hurst and Stewart, 1929). In men the risk of duodenal ulcer appears to be almost constant between the ages of 20 and 55, and the risk of gastric ulcer to increase slowly to a peak in middle age. We are conditioned to regard such sex and age differences as constitutional in origin, but social and cultural influences also enter into them. The process of ageing is not only inherently determined; every organism incorporates its life experience from birth onwards. Diverse experiences may thus produce a varying response to ageing, and equally a varying response in the sexes.

Dramatic changes in North-West Europe over the last 150 years in the sex and age incidence of peptic ulcer emphasize the role of the environment. An interpretation of the pattern of acute perforations suggests that during this period there have been three observable syndromes: perforations of acute gastric ulcers in young women; perforations of duodenal ulcers in young and middle-aged men; perforations of gastric ulcers in older men and women (Jennings, 1940).

It seems likely that in the nineteenth century young women were the chief sufferers from ulcers. The Registrar General wrote in his Report of 1905:

> 'Gastric ulcer does not appear frequently as a cause of death until the attainment of the reproductive period, when the female rate greatly exceeds the male, while at the later ages the male rate is in excess'.

These young women apparently had acute gastric ulcers, and death came as a sudden disaster from hæmorrhage or from perforation. It is remarkable that this condition seems to have decreased in importance by the end of the nineteenth century, and to be unusual in the twentieth century. The reasons for this changing incidence are not understood.

Nor is it evident why juxtapyloric ulcers of middle-aged men, the commonest peptic ulcers of the present times, should have been so little known sixty years ago. When, in 1901, Moynihan gave his famous description of acute perforation, he was firing a shot in the battle for the recognition of a new disease as an emergency amenable to surgical treatment. From then until recently, there has been a continuing increase in perforations of duodenal ulcers in men (Illingworth, Scott and Jamieson, 1944; Weir, 1960). It is true that better facilities for medical care and transport might bring more perforations to notice, and changes in the age and sex structure of the

population might give a false impression of a rise of incidence, but such factors could hardly have affected the location of ulcers so differently in the various sex- and age-groups.

With the increase in perforations has come a sharp rise in mortality rates from peptic ulcer in the twentieth century. It has been held that this rise, particularly in ulcers of the duodenum, is a price we pay for civilization and industrialization. The notable appearance and disappearance, for no obvious reason, of ulcers in young women may make us wary of such assumptions. The recent statistics for duodenal ulcer also enjoin caution. In York the volume of all cases with established diagnosis shows a downward trend (Pulvertaft, 1959), and the total duration of spells of sickness certified to duodenal ulcer is reduced (Ministry of Pensions and National Insurance, 1959). Finally, death rates for duodenal ulcer reached a plateau during the last decade and have begun to decline.

The third group of acute perforations distinguished by Jennings were gastric ulcers in older men and women. The recognized cases in hospitals during the period between the 1914-18 and the 1939-45 Wars remained constant (Illingworth, Scott and Jamieson, 1944), but from analyses of death certificates it appears that a decline, even more marked than with duodenal ulcers, has recently set in. In part this could result from better treatment (Doll, 1952), but there has probably been a real change in the illness.

Indeed these trends taken together suggest that we are observing a recession of the gastric and duodenal ulcer syndromes. It seems probable that a wave of duodenal ulcers, which early this century began to affect young and then middle-aged men, is today receding in these age-groups because they have experienced an environment different from that of their predecessors. The wave is still manifest amongst older men who experienced the earlier environment. The most plausible explanation, which accommodates all these changes, is that men born in Britain between 1875-90 suffered from particular environmental experiences which enhanced their chances of developing ulcers, and that this risk is still carried by the survivors. Cohort analysis—that is, an examination of the experience of each age-group as they grow older through the years—shows that with impressive regularity from 1850 the risks increased for each successive group to a peak and then declined. For gastric ulcer the generation born 1885-89 carried the highest risk, for duodenal ulcer the generation born 1890-94. The statistics of the next decade must be awaited to give confirmation to this hypothesis, but it seems improbable that peptic ulcer can be regarded as mainly a disease of civilization, in the sense that it is caused by the continuing stresses common to industrial societies. Some risk particular to the time must be sought: for instance, the 1914-18 War.

SOCIAL CLASS

Industrial societies are divided not only vertically into localities, but horizontally into social classes. The Registrar General has devised a means of

using occupations as an index of social class, by ranking them in five separate groups according to social prestige. These class environments show variations in ulcer rates. The pattern over time is not stable, and again it seems that each age and social class is carrying forward its own particular risk.

The most recent mortality statistics relate to the period around the 1951 census. These show that at ages under 70, deaths from duodenal ulcer are

Years	Social class	Ages						
		20-24	25-34	35-44	45-54	55-64	65-69	70+
1921-23	I and II	1	3	5	*10	12	18	15
	V	2	3	8	8	9	6	6
1930-32	I and II	1	3	6	13	*19	24	35
	V	1	4	9	14	14	13	15
1949-53	I and II	0.3	0.8	3	11	20	40	*62
	V	1.0	3	6	16	29	40	46

*Indicates age-group at which gradient is reversed.

TABLE I.—Mortality in males from duodenal ulcers, by age and social class. (Deaths per 100,000 living to the nearest whole number.) Taken from Morris and Titmuss (1944) and the Registrar General's Decennial Supplement, 1951, Occupational Mortality, Part II, Vol. II.

Years	Social class	Ages						
		20-24	25-34	35-44	45-54	55-64	65-69	70+
1921-23	I and II	1	3	7	13	18	21	23
	V	3	5	14	20	19	22	17
1930-32	I and II	1	3	8	17	24	37	39
	V	2	8	19	31	31	27	31
1949-52	I and II	0.1	0.3	1	7	18	33	63
	V	0.3	1	3	17	34	54	63

TABLE II.—Mortality in males from gastric ulcers, by age and social class. (Deaths per 100,000 living to the nearest whole number.) Taken from Morris and Titmuss (1944) and the Registrar General's Decennial Supplement, 1951, Occupational Mortality, Part II, Vol. II.

least in the highest social classes (table 1). This has come about because of a decline in the death rate in young and middle-aged men. The pattern of the 1951 census is repeated in the recent incidence of new cases in York (Pulvertaft, 1959). At ages over 70 the gradient between the classes is reversed and death rates are greatest in the higher social classes. It seems that the recession of the wave of duodenal ulcers is occurring first in young men of the higher social classes. Perhaps also the noxious environment first affected those of the higher classes, but social class statistics do not go back far enough to support this inference. The social class changes in mortality from gastric ulcers again seem to have preceded those of duodenal ulcers (table II). In 1921-23, when the statistics first became available, the pattern of gastric ulcer deaths in the social classes was similar to the current one for duodenal ulcer. Since then there has been a heavy concentration in

the lower social classes, of both deaths and sickness from gastric ulcer (Doll, Jones and Buckatzsch, 1951; Pulvertaft, 1959).

TOPOGRAPHY

Ulcer syndromes in environments separated by space show variations no less striking than in environments separated by time and class. Thus there is a very high rate of gastric ulcers among Japanese, with an ulcer death rate of 34.7 per 100,000, as compared with rates of 14.1 in England and Wales and 4 in France. Some of these variations might be attributed to racial factors. In Johannesburg, at necropsy ulcer scars are found very rarely in black South Africans, but in white South Africans no less commonly than in Europeans (Eagle and Gillman, 1938; Becker, 1958), whilst in Java the small number of ulcers found in Javanese at necropsy contrasts with the many found in Chinese (Kouwenaar, 1930). Negroes in Uganda and South Nigeria (Raper, 1958; Ellis, 1948; Konstam, 1954), on the other hand, appear to be much more susceptible than related Johannesburg negroes, and Malayans are reported to be more susceptible than related Javanese (Marsden, 1958) so that non-racial factors must be influencing the rates.

Similar racial groups show marked regional variations, not only in Southern India (Dogra, 1940) and in Uganda (Raper, 1958), but also in Britain. Thus there appears to be an increasing incidence of duodenal ulcer from the South of England to the North (Watkinson, 1958; Pulvertaft, 1959), and acute perforations in Aberdeen are twice as common as in York.

Urbanization.—The environments of town and country are also associated with a different occurrence of ulcer. In Britain, mortality, prevalence, and the incidence of new cases all show a higher rate in cities (Morris and Titmuss, 1944; Doll, Jones and Buckatzsch, 1951; Pulvertaft, 1959), and similar results have been obtained elsewhere (Bager, 1929; Alsted, 1953). The higher urban rate is probably not dependent on the availability of medical care (Doll, Jones and Buckatzsch, 1951) and in York it now shows signs of approximating to the rural rate (Pulvertaft, 1959), because of a fall in urban rates.

SPECIFIC FACTORS

From this analysis of a series of environments it is evident that environment profoundly influences peptic ulcer, but much has yet to be done before the specific physical and social factors within these environments are isolated. Discussion is necessarily concerned as much with hypotheses as with established fact. The variations in prevalence are such that no single factor can account for them, and it is necessary to invoke a number of factors, acting together in some circumstances, and independently in others.

DIET AND SMOKING

Diet.—Factors which can act directly on the gut are naturally suspect. The observations of McCarrison (1932) on the diversity of Indian diets led him to postulate a dietary factor in peptic ulcer. He found marked deficiencies

among the poorer people living in the South in whom duodenal ulcers were common, contrasting with good nutrition in the Punjab where ulcers were rare. Other authorities have tentatively advanced a dietary hypothesis (e.g. Avery Jones, 1955, 1957), but there is as yet little direct evidence to incriminate either particular diets or particular elements of diets such as processed foods and hot spices. Some studies suggest that there may be a thermal effect: for example, drinking hot tea seems to promote gastritis (Edwards and Edwards, 1956). Irregular meals or the presumed irregularities that arise from shift work do not seem to be of major importance despite the general impression to the contrary (Bashford and Scott, 1935; Doll, Jones and Buckatzsch, 1951).

Diet could play an indirect part in the low peptic ulcer rates found in black South Africans. High œstrogen levels, with gynæcomastia and small testes, are common in malnourished Africans (Gillman and Gillman, 1951), and œstrogen balance may be the common factor that protects both Africans and pregnant women from ulcers. Recently in Britain, treatment of duodenal ulcers with œstrogens has been reported to be beneficial (Truelove, 1960).

Smoking.—Products of tobacco smoking, which might act directly on the intestinal mucosa or through the autonomic nervous system, have been suspected of damaging the gut, and there is a moderate degree of association of peptic ulcer with smoking (Doll and Hill, 1956; Brown, McKeown and Whitfield, 1957). The evidence is against the supposition that patients take up smoking to relieve their symptoms, but it is possible that smoking is not causal, and that personality type or other factors predispose both to ulcer and to smoking. However, the fact that smoking delays healing and therefore maintains the chronicity of ulcers is good evidence for some causal effect (Doll, Jones and Pygott, 1958). On the other hand, variations in smoking habits in different environments do not seem to contribute much to different ulcer rates, at least as between town and country.

OCCUPATION

Particular occupations have long been thought to carry a special risk of peptic ulcer. Beliefs have ranged from an alleged high risk run by boot-makers from external pressure on the stomach, and by cooks from the tasting of hot spices, to the supposedly high risks run by transport workers, bus drivers, and others, but Doll, Jones and Buckatzsch (1951) found no basis for this latter widely held belief. This team provided well-founded knowledge on the association of ulcer and occupations from a survey of ulcer morbidity in London. Agricultural workers had a small ulcer morbidity, which conforms with their low mortality rates, and with observations made in most other studies (e.g. Department of Health for Scotland, 1935; Ginanneschi, 1938; Stewart, Webb and Hewitt, 1955). High morbidity was recorded for doctors, but this could be ascribed at least in part to early and accurate diagnosis. Managers and foremen in industry showed a modest excess of duodenal ulcers.

Interpretation of these findings is not simple. The distributions are not caused by workers who suffer disability from ulcers, and who therefore select particular occupations for relief. Such men are attracted by sedentary occupations which, despite this loading, have a low ulcer morbidity (Doll, Jones and Buckatzsch, 1951). It is possible that the differences between occupations indicate a relationship between duodenal ulcer and work fraught with conflict situations. These are common to the positions of foremen and managers (Jacques, 1951), and perhaps less usual among agricultural workers. The contribution of occupation, however, must be separated from the general way of life of the worker. Among countrymen it is only farm-workers who seem to have low rates, and not landowners (Alsted, 1953) or those in other occupations. But foremen and managers do not share a common social background, whilst they do share certain job conflicts and high ulcer rates.

ANXIETY

Recurrent conflict is likely to promote anxiety. In the survey of Doll and his colleagues, readily expressed anxiety about work was much more common among foremen than amongst others, and among patients with active or inactive duodenal ulcer than among patients with gastric ulcer or controls. Nevertheless the occupation might not cause the anxiety. It remains possible that anxious, conscientious men tend to incur a high risk both of becoming foremen and of falling sick with duodenal ulcers. Miners, however, a very different group of men who are also beset with special anxieties and who probably take up the work for social rather than psychological reasons, have also a high rate of sickness from ulcers (Department of Health for Scotland, 1935). In general, this evidence seems to support the clinical impression that occupations giving rise to anxiety are conducive to peptic ulcer.

The role of anxiety as a precipitating factor in peptic ulcer and its complications is suggested by a number of other observations. In the series of cases reported by Davies and Wilson (1937, 1939) events with emotional connotations preceded the onset of symptoms in more than 80 per cent. of men with peptic ulcer, and in less than 20 per cent. of men with hernia. Only one of 83 cases of perforation or hæmorrhage did not evince emotional stress. Similar emotional accompaniments of the onset or recrudescence of ulcers are reported by other observers (Mittelmann and Wolff, 1942; Wolf, 1949). These direct and uncontrolled clinical observations are supported by epidemiological evidence of peaks in the incidence of acute perforations and deaths from peptic ulcer during times of heightened anxiety, for instance in the bombing of Britain during the war (Stewart and Winser, 1942; Spicer, Stewart and Winser, 1944; Morris and Titmuss, 1944). The material of Illingworth, Scott and Jamieson (1944) does not precisely support this finding, but it shows troughs in the incidence of perforations in the late summer, on Sundays and Mondays, and during the night: that is, after or during rest from work.

Physiological experiment indicates how these external factors provoking

anxiety may find a pathway to the gut. The notable effect of emotion on the function of the stomach has long been known and elaborated (Beaumont, 1833; Pavlov, 1941; Wolf and Wolff, 1943). Conflict and repressed aggression have been shown to produce hypermotility and hypersecretion of the stomach in some subjects, and at the same time a lowered pain threshold and fragility of the mucosa. Such hyperfunction is characteristic of the stomach in duodenal ulcer and may be accompanied, especially during periods of personal conflict, by a rise in blood and urine levels of the proteolytic enzyme pepsinogen (Mirsky, Kaplan and Broh-Kahn, 1950). In experiments all these signs regress as the emotional provocation is removed, and as yet we lack evidence to show a continuing effect that could maintain chronic ulceration. Nevertheless, the drift of the data accords with the role of anxiety as one causal factor in some types of ulcers and their complications.

PERSONALITY

Chronic anxiety is as likely to have an internal as an external source. Hippocratic concepts lead to the ready assumption that particular constitutions, or personalities with specific emotional patterns, may favour the occurrence of peptic ulcers (von Bergmann, 1913; Draper and Touraine, 1932).

Personality is a complex attribute compounded of a web of inherited qualities and experience. The impact of experience in different cultures and in individual families is thus a variable in the structure of personalities, and in any disorders to which they predispose. Alexander (1934) regarded the central conflict of the 'peptic ulcer personality' as the struggle for adult independence against feelings of dependence on parents and figures of authority. Like many untested clinical impressions, this concept has gained strength as it reverberated through the literature. The first controlled study revealed no differences between ulcer patients and other hospital patients in such characteristics of the family or upbringing as number of children, composition and social class, or in educational standard, in childhood illness and in experiences of early separation from parents (Kellock, 1951).

Goldberg (1958) has since made an attempt to elucidate the more subtle elements of relationships in the families of 32 young men with duodenal ulcer and their 32 controls selected from a general practice. She found neurotic traits common in families of both cases and controls, but certain patterns of relationship were more common in 'ulcer' families. Thus the mothers tended to have psychogenic symptoms, to be striving, obsessional, and dominant in the home; fathers tended to be steady, unassertive and passive. Many of the young patients showed a lack of open aggression. Psychologically dependent patients had had dominating mothers who were markedly indulgent and protective; independent patients had had dominating mothers who were markedly restrictive and protective. The description of these families is consistent with Alexander's hypothesis, although it is difficult to evaluate unconscious bias in such a study. It emphasizes the conflict in duodenal ulcer patients between dependence engendered by a

powerful mother and the demands of adult roles. The configuration of a family thus seems to be related to the occurrence of duodenal ulcers. Furthermore, there was in the ulcer families a higher prevalence of ulcers and dyspepsia. Previous studies have clearly established such a familial factor (Spiegel, 1918; Doll and Buch, 1950), but it is not possible to assign these familial effects in proportion to hereditary and environmental causes.

CONCLUSION

The variations in peptic ulcer in different historical, social and topographical contexts are unequivocal evidence of the influence of ways of life in this disease. The specific elements that contribute to the variations probably include diet, tobacco, anxiety, personality and genotype. None of these has of itself a sufficiently powerful effect to cause such large variations, and several may act in concert in different combinations.

'Civilization', as a cause of ulcer, refers to industrial society. For women this has brought a growing economic independence and authority in the home as the burden of bearing and rearing children has decreased. For men it has brought a reciprocal increase in responsibility and a decline in authority in the home. At the same time, with the growth of large organizations and the nature of careers within them, many men face a new type of conflict situation. Thus the unequal response of the sexes to historical change may provide an etiological clue, but these are continuing changes which cannot readily account for both the rise and the fall of the peptic ulcer syndrome among men. More obvious changes in the environment, for instance in nutrition, and especially the effects of the two world wars, require at least equal consideration.

SUMMARY

The occurrence of peptic ulcer has been considered in terms of the various indexes of incidence and prevalence.

Marked differences are found at different ages, and between the sexes, and these differences have altered over the last 150 years. In the 1950's there are signs that the volume of both gastric and duodenal ulcers has reached a plateau and has begun to diminish, especially in younger age-groups. The social class patterns are also changing over time. It seems probable that a wave of peptic ulcers which early this century began to affect young and then middle-aged men is today receding in these age-groups because they have experienced environments different from those of their predecessors.

Topographical variations also emphasize the influence of environment.

The evidence for specific factors which may be concerned in the variable occurrence of peptic ulcer in different environments is reviewed. Such factors include diet, smoking, anxiety from external stress, and personality stress, and others as yet to be defined.

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THE CLINICAL DIAGNOSIS OF PEPTIC ULCER

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THE typical history of duodenal ulcer is one of the most characteristic in the whole of clinical medicine, and its well-known features may make the diagnosis so easy that it is unnecessary to do more than mention them very briefly. In some cases, however, peptic ulcer is atypical and its well-accepted characteristics are not always as definite as are believed. I propose therefore to draw attention only to some of those points which may be misleading in diagnosis, and to emphasize a few distinguishing symptoms and signs which may help to differentiate peptic ulcer from other conditions.

PERIODICITY

The typical history of duodenal ulcer is usually regarded as one in which periods of freedom from symptoms, at first of long duration, gradually become shorter and shorter until after some years pain no longer remits but becomes practically continuous. In some, a gradual change from bouts of epigastric pain to a state of mild persistent discomfort with anorexia and vomiting takes place due to the development of pyloric stenosis.

In my experience it is at least as common for the course to be more benign and the periods of freedom to get longer, the pain less severe, and the condition to become actually less and less disabling and more and more easily controlled. In fact the view that there is *inevitably* a progressive increase in the number of attacks and in the disability caused by duodenal ulcer is certainly untrue and both the severity and the frequency of attack often lessen with age.

In about 5 to 10 per cent. of cases the course is very different and, by contrast, presents an intractable, progressive and almost continuous development of symptoms which are difficult or impossible to control either medically or even by partial gastrectomy. A few of these may belong to the rare Zollinger-Ellison syndrome (see p. 317), when the diagnosis is made difficult by reason of the severity of the condition and its failure to respond to any of the usual methods of treatment.

BUILD AND PERSONALITY

The duodenal ulcer patient is generally thought to be of thin build with good general health and energy above the average. It is certainly true that as a rule he does not complain of weakness or tiredness and in this respect he is in contrast to the anxiety dyspeptic whose symptoms are often as much general as digestive, and whose exhaustion may be the most noticeable

feature of his condition. Duodenal ulcer is said to occur especially in men of over-active, over-conscientious and obsessional type, but these points must not be allowed to carry too much weight in diagnosis. In fact, studies of the obsessional nature of the duodenal ulcer subject have not always shown any consistent preponderance of this symptom as compared with other people and my experience confirms the view that all types of personality present with duodenal ulcer.

AGE AND SEX

It is unusual for peptic ulcers to occur in children under 15 and, as compared with men, it is unusual to find duodenal ulcers in women under the age of 50. This curious preponderance of men over women in the case of duodenal ulcer virtually disappears after the menopause and the incidence of fresh ulceration then becomes about the same in the two sexes. In other words, it is at about the menopause that duodenal ulcers tend to begin in women, and the diagnosis is often missed, especially as in some cases sensations of nausea alone may replace the typical hunger pain.

The incidence of peptic ulceration in children may be greater than is believed. Certainly the diagnosis is not often made, but this may be partly because the symptoms are often so atypical. The majority of cases show no clear relationship of pain to eating. This may be because many children in any case eat almost all the time, or at least whenever they feel hungry, so that any food-pain relationship is obscured. In general the free intervals in children tend to be short, but there is usually relief with alkalis. Some night pain is usual and this in a child should always arouse suspicion of a peptic ulcer. In my experience the incidence of duodenal ulcer in schoolgirls up to the age of 18 is as high as in boys and the marked sex difference which is so characteristic from the age of 20 to 45 is absent. My cases seem to have occurred especially in children who were under unusual strain such as unhappy or broken homes and parents who were quarrelling.

ULCER PAIN

The pain of peptic ulcer is usually epigastric, but its time of onset in relation to food, its localization and its radiation, depend to a large extent upon exactly where the ulcer is situated in the stomach or duodenum.

It is typical of duodenal ulcer pain to occur late—i.e. two, three, or four hours after eating, but it is much less typical for gastric ulcer pain to occur early than is generally believed: in my experience gastric ulcer pain is almost as often late as is duodenal ulcer pain. Indeed it is most difficult to predict from the time of the onset of the pain alone whether an ulcer will turn out to be gastric or duodenal.

Relief of pain on eating may also occur in both gastric and duodenal ulcer, but in the former it is usually short-lasting. Such relief is not quite such a constant feature of duodenal ulcer as is sometimes believed and I found that

only half my duodenal ulcer patients were *regularly* relieved by food, whilst many stated that food had quite erratic effects from day to day, or that it made them worse! The effect of food upon the pain seems to be much less constant in women than in men.

Relief by taking alkalis is a feature common to so many forms of dyspepsia that it is a diagnostic point of very little help; certainly the majority of duodenal ulcer patients are helped by alkalis and over half my own patients found that they consistently relieved their pain. Like the effect of food, so that of alkalis upon pain is partly dependent upon the chronicity of the ulcer and the presence or absence of complications such as pyloric stenosis.

Night pain is very typical of duodenal ulcer, but to my surprise I found that only about one-third of my duodenal ulcer patients noted specifically that pain woke them out of sleep. It is, however, a symptom which when present is very suggestive of duodenal ulcer, in contrast to the pain which patients notice if they wake early in the morning, and is especially typical of colon spasm and nervous dyspepsia. Pain arising from juxta-pyloric, or pyloric channel ulcers as they are sometimes called, may arise in the presence of low gastric acidity and often at once on taking food. These ulcers are most atypical; the pain is variable in its relationship to food and may be colicky in nature, at times coming on actually during a meal. Vomiting is very usual.

Posterior wall ulcers that become adherent to the pancreas commonly give rise to pain in the back, which may be atypical in that it no longer has any food relationship at all. This is because pain of this nature is carried by somatic fibres with end-organs in the peritoneum, diaphragm, mesentery or body wall and is not visceral, which is carried from the stomach by the sympathetic (splanchnics) or vagal pathways. Such somatic pain indicates that the ulcer is penetrating the peritoneum and has probably become adherent, and may thus be affected by movement and exercise.

Pain like that of angina pectoris is unusual in cases of peptic ulcer. If such pain does occur it is much more suggestive of a hiatus hernia, although pain going to the neck and jaws can in rare cases be caused by a high gastric ulcer. Such pain is particularly likely when there is gastric rotation or volvulus, as in severe degrees of pneumatosis of the stomach of the 'cup and spill' type, but this is uncommon. Even more infrequent is ulcer pain going into the left arm.

PAINLESS ULCER

It is not very rare to discover a large duodenal ulcer radiologically in a patient who has had a hæmorrhage but denies any previous history of abdominal pain or dyspepsia. Some of these unusual cases show large chronic ulcers and certainly not just superficial erosions which are, of course, usually quite painless. Painless ulcer seems especially prone to be found in alcoholics, and in patients with cirrhosis of the liver. In the latter case the difficulty of assessing the cause of a hæmatemesis may be extreme. It is, of course, a

common experience for a patient to become clinically free of pain while a large ulcer crater is still demonstrable by radiology.

An interesting and atypical type of duodenal ulcer is that in which the pain is absent but is replaced by nausea or a feeling of sinking. This has occurred in my experience most often in women; though it is not common it is a point of some importance. It is also more frequent in the older patient than the younger.

MALIGNANCY

Ulcers on the *greater curvature* of the stomach are not common. They often cause a feeling of fullness rather than pain and may show a relationship to position and movement rather than to eating. Most of these ulcers prove to be malignant.

Very big 'giant' ulcers in the stomach always raise the suspicion that they are malignant and for a long time it was thought that they nearly always were so; in fact it is far more usual for such ulcers to be benign. Occurring most commonly in women over the age of 60 and often over the age of 70, they may give rise to severe pain but this is often uncharacteristic, having little relationship to eating and being felt more in the back than in the epigastrium. There is often a fear of eating and consequent loss of weight so that the patient may be thought to be suffering from a primary depression or a carcinoma of the pancreas.

One of the most perplexing of all diagnostic deceptions in peptic ulceration is that from time to time the most typical simple peptic ulcer proves in fact to be malignant. Probably about 5 per cent. of apparently benign gastric ulcers are in fact malignant from the start, and perhaps another 5 per cent. are true ulcer-cancers. After those occurring on the greater curvature the most likely ulcers to be malignant are those situated in the antral region, and it is important to remember that, however typical an ulcer in this situation may seem to be, it may nevertheless be a primary carcinoma; such a characteristic feature of carcinoma as anorexia may be quite absent, though later when the diagnosis is clear it may of course develop. In many of these cases the symptoms are continuous from the start but in some there are no distinguishing features at all from simple ulceration for perhaps two or three years, and even at operation it may be impossible to be sure on naked-eye examination which it is. Gastric analysis in such cases may show a high acidity and be quite unhelpful. In a few cases of carcinoma the onset is with hæmatemesis or melæna, though this is more common with ulcer than with cancer. It is helpful to remember the high incidence of carcinoma of the stomach in men compared with women: my own ratio among recent cases has been 73 men to 32 women.

In general it must be accepted that pyloric ulcer even in young men should always be regarded with suspicion and that *certain* exclusion of carcinoma may not be possible clinically.

DUODENITIS

Sometimes in an apparently typical case of duodenal ulcer it is impossible to demonstrate an ulcer radiologically and, if operation be performed, no ulcer is found. Such cases are, of course, most often due to an anxiety state with dyspepsia but in a few the most careful psychiatric assessment fails to show any abnormality sufficient to cause ulcer-like symptoms. These cases seem to occur most often in men between the ages of 20 and 40; they have a typical food-pain relationship, are relieved by milk and alkalis, and are awakened in the night with characteristic epigastric pain. The symptoms, however, are usually not intermittent and most often they have fairly continuous pain with only short free periods lasting for not more than a few days at a time. Gastric analysis shows a hypersecretion of acid and they may require hourly feeds or even a milk drip to give symptomatic relief. These are cases of true duodenitis. They are certainly not common but equally certainly they represent a definite and recognizable condition. In some cases an x-ray will show coarsening of the duodenal mucosa, but more often repeated radiological examinations are reported as normal or show at most an irritable duodenum, even after the most careful search for the difficult post-bulbar ulcer, which can so easily be missed.

COLONIC SPASM

Most patients with duodenal ulcer are constipated unless they are taking too much laxative such as magnesia; often there is tenderness over the sigmoid in the left iliac fossa and pain in this area, which I attribute to colon spasm. In a few cases pain may be felt in the left iliac fossa with little or no discomfort in the epigastrium and this may be due to the ulcer being adherent to the pancreas, when pain may be felt in the back and downwards to the left side.

CONSTIPATION

Constipation may be a very pronounced feature also in cases of pyloric stenosis, and here it may be due in part to dehydration. The diagnosis then may be difficult and the distinction from intestinal obstruction not easy.

An interesting patient of this type was a man who was recently under my care, having been admitted to hospital as a case of intestinal obstruction. He was aged 65 and had complained of recurrent pain in the sigmoid region for over ten years, with much constipation. There was no food-pain relationship and no complaint at any time of epigastric pain or discomfort. An x-ray of the abdomen showed multiple fluid levels in the intestine and a much dilated duodenum, but no evidence of any ulcer or other lesion. At operation an enormous duodenal ulcer was found, with a bleeding artery at its base, and no other abnormality.

Another patient, Mrs. S. aged 45, had complained of generalized abdominal pain radiating into the back and the left iliac fossa for about two years. There was severe constipation for which strong aperients had been taken, and much air-swallowing, flatulence, and distension. Here also I suspected chronic intestinal obstruction, but at operation an enormous adherent juxta-pyloric ulcer was found which was resected with great difficulty and a partial gastrectomy performed. No bowel lesion was found, postoperative progress was excellent, and the constipation ceased almost immediately after the operation.

It is also easy to miss a colonic lesion which may be causing ulcer-like symptoms. This mistake is sometimes due to the error which can arise following a whole-trace barium meal examination, since the duodenal cap may perhaps be irritable and not fill well whilst the colon cannot be completely investigated by this type of examination. Thus a diagnosis of duodenal ulcer and a normal colon may be made when a barium enema might have demonstrated an organic lesion in the bowel.

Mr. C., aged 50, complained of 'wind', epigastric discomfort and pain on and off for two years which woke him at night and was relieved by rest in bed. A whole-trace barium meal showed an irritable duodenum and a minor degree of diverticulosis, so that the diagnosis of duodenal ulcer with colonic spasm was made. Careful questioning disclosed, however, that the attacks of pain were somewhat colicky in type, were not relieved by alkalis, and were affected by position, being worse when sitting and better lying flat. A barium enema showed a growth at the hepatic flexure of the colon which at laparatomy was inoperable, with metastases in the liver.

DIARRHŒA

Ulcer symptoms are less often associated with diarrhœa, but this combination has at least one very definite and important, though uncommon, cause. This is the Zollinger-Ellison syndrome, in which constant and intense gastric acid secretion—up to 9 litres in twenty-four hours—sets up such a severe duodenitis and small intestinal irritation that food absorption is grossly disturbed and true steatorrhœa develops. Severe diarrhœa, with ulcer pain and much wasting, should raise the suspicion of this condition which is important both from its bearing on the etiology of ulcer and its possible relief by resection of a tumour—benign or rarely malignant—from the pancreas.

Gastric ulcer is more often associated with diarrhœa than is duodenal ulcer and this may be due to extreme intestinal hurry so that after a barium meal the barium may reach the rectum within two or three hours. This may be associated with low gastric acidity but, when irregular ulcer-like pain, diarrhœa, and achlorhydria are found, carcinoma of the stomach is the most likely diagnosis.

Most often diarrhœa in a case of peptic ulcer is due to overdosage with alkalis, but one cause which may cause difficulty when hunger pain and diarrhœa occur together is giardiasis. This is not so rare or so symptomless as is often believed. The parasites are located in the duodenum and, though they do not always cause symptoms, they may sometimes lead to epigastric pain very like that of duodenal ulcer together with troublesome diarrhœa.

HIATUS HERNIA

Duodenal ulcer is often found with hiatus hernia which may make the differential diagnosis very difficult. Hiatus hernia is more often seen in women than in men and severe heartburn, made worse by bending or lying flat, is highly characteristic. On the other hand, hiatal symptoms may be periodic like those of ulcer and are usually relieved by alkalis and often by

milk. In some cases of hiatus hernia there may be severe retrosternal pain which spreads to the neck and the jaw: this is infrequent in cases of gastric ulcer.

Any digestive symptoms arising in women over 45 who are overweight will of course arouse suspicion of a hiatus hernia, or of gall-bladder disease, but it is particularly in these patients that peptic ulcer is apt to remain undiagnosed and the symptoms be attributed to nervous dyspepsia, perhaps associated with obesity, 'visceroptosis' or the menopause. In general it is fairly true to say that the larger the hernia the fewer the symptoms and in the differential diagnosis of ulcer and hernia from an anxiety state with dyspepsia it is important not to be guided too rigidly by radiological findings. The more marked the general symptoms of exhaustion, headache, fainting sensations, intolerance to unusual foods and bowel irregularities, the less likely is surgical treatment of a hiatus hernia or peptic ulcer to produce successful results.

PANCREATITIS AND GALL-BLADDER DISEASE

Pancreatitis.—The most suggestive points which help to distinguish chronic relapsing pancreatitis from duodenal ulceration are the following: pain of severe degree persisting without remission for periods of several days or more, with radiation especially to the left side of the abdomen and back; vomiting with loss of weight and often pyrexia during attacks which are usually of shorter duration but greater intensity than those of ulcer. Unlike that of peptic ulcer, the pain of pancreatitis is sometimes relieved by sitting up and made worse by lying flat.

Gall-bladder pain is often epigastric and not right-sided and may be very difficult to distinguish from that of peptic ulceration. Tenderness on pressure over the gall-bladder region is a most unreliable sign and in many cases there is no history of biliary colic or of jaundice. In general the symptoms tend to be more irregular and less periodic in gall-bladder disease than in peptic ulcer, but in many cases only full radiological investigation will enable a diagnosis to be made.

THE MEDICAL TREATMENT OF PEPTIC ULCER

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ANY consideration of the medical treatment of peptic ulcer naturally divides itself into two sections, dealing respectively with gastric and duodenal ulcer.

GASTRIC ULCER

Although some gastric ulcers heal themselves with simple domestic treatment (and not uncommonly are seen to do this in the interval between outpatient attendance and admission to hospital), the majority require bed treatment.

Rest in bed is by far the most important single factor in the healing of a gastric ulcer and should be maintained until the ulcer is seen to be healed. Diet should be simple, soft and as ample as the patient desires. Milk drinks should be given between meals—as much for their calorific value as for their buffering action on gastric acidity. Drugs are relatively unimportant. It is customary to give an antacid after the main meals and it is reasonable to saturate the patient with ascorbic acid as many of them have been taking inadequate diets for some time before coming under treatment. Mild sedation by day with amylobarbitone sodium, ½ to 1 grain (30 to 60 mg.) thrice daily, is desirable for most of the patients and sound sleep at night should be ensured. Smoking should cease.

If a gastric ulcer is capable of healing it will do so with this simple regime, though the healing time varies from three weeks to three months or more. The average is about five weeks and bed treatment should be maintained until the ulcer is seen to be healed. If a gastroscopist is available assessment of healing is best done by this means at intervals of three to four weeks; patients tolerate repeated gastroscopy remarkably well. Otherwise it has to be done by radiology which in this respect is less accurate. The amount of scarring left by a healing gastric ulcer also varies greatly and is important in prognosis. Some ulcers heal rapidly and leave practically no trace whatever. Others, slower to heal, leave gross and obvious scarring. Such a scar remains as a weak point in the gastric mucosa and relapse is likely. Most gastric ulcers taking longer than eight weeks to heal are probably best treated surgically, but at this point the practical difficulty is encountered of persuading a patient who has already spent two months in bed, and is by now feeling very well, to spend a further three weeks or more undergoing operation. In practice one usually has to send them home and delay surgery until the relapse occurs. Some gastric ulcers will not heal under medical treatment. In those cases in which ulcer pain persists after three weeks'

bed treatment the prognosis for healing is poor and time can be saved by advising surgery at this stage.

The results of medical treatment are reasonably good in gastric ulcers with a short total history. These have a lower tendency to assume a chronic relapsing course than duodenal ulcers and many of them will remain healed.

Partial gastrectomy should be advised if relapse occurs after a full course of medical treatment in which the ulcer has been seen to be healed. In saying this, however, it must be accepted that many gastric ulcer patients are elderly and have other complicating ailments which may make them poor operation risks. In this group every case must be assessed on its own merits and clearly there will be a residuum of cases in which partial gastrectomy as a planned procedure can never be seriously contemplated. The problem of the unhealable gastric ulcer in a patient too decrepit to withstand surgery is one which has no real answer.

GASTRIC ULCER AND GASTRIC CANCER

Although it is now generally accepted that malignant degeneration of a simple gastric ulcer is very rare, there is nevertheless a definite association between gastric ulcer and cancer of the stomach. The two conditions not uncommonly arise in the same stomach and the incidence of carcinoma developing in the remains of the stomach after partial gastrectomy for gastric ulcer is appreciable. Thus, although the knowledge of this association is often used as a point in favour of surgery, it must be recognized that the argument has its limitations. If two-thirds or more of the stomach is removed, the risk of subsequent carcinoma is certainly reduced, but short of total gastrectomy it is never quite absent.

Of far greater practical importance than consideration of future malignancy is the immediate question which so often arises as to whether or not an ulcer crater seen at x-ray is benign or malignant, and this raises important points in management. Several criteria are used by radiologists and of these the one which is of least importance is size. There is a tendency for all very large gastric ulcer craters to be regarded as probably malignant; in fact most of these turn out to be benign. They often occur in elderly people and often the history is a short one. It is important to know that many of these very large gastric ulcers heal with remarkable speed, and they should certainly be given a chance to do so. In some of these doubtful cases diagnostic gastroscopy is helpful in that it may show an obvious ulcerating cancer, but unfortunately the converse does not hold and the gastroscopist can never be entirely certain that an ulcer crater is benign.

This diagnostic difficulty has always existed and will undoubtedly continue. It must never be deployed as an argument for hasty gastrectomy, because uncertainty is likely to remain even when the abdomen is open, and it must be realized that gastrectomy for cancer is a much more formidable procedure than gastrectomy for benign ulcer. Whenever possible the surgeon

should know in advance which of the two he is being asked to deal with. In these difficult cases in which a certain amount of doubt remains after thorough investigation (including gastroscopy) the right course to adopt is a three-week trial of strict medical treatment with further assessment of symptoms, weight, x-rays and gastroscopy at the end of this period. The malignant ulcer will not improve and the benign ulcer which is not showing definite evidence of healing, and in which symptoms persist, should be treated surgically without further delay. The three weeks so spent are never wasted. The prognosis is not worsened in the carcinomas, operation is facilitated in those benign ulcers which fail to heal and many elderly patients will heal their ulcers.

DUODENAL ULCER

This is a disease with a strong tendency to become chronic and relapsing and, as in all such ailments, it is more proper to speak of management than treatment. We apply medical treatment to the relapses of duodenal ulcer as and when they occur but management involves the general direction of activities and events throughout the whole career of the ulcer. The former is easy and straightforward; the latter much more difficult and less predictable and it is necessary to be quite clear as to what one is trying to achieve and the limitations of medical management.

The few long-term follow-up studies of medically treated ulcer patients have shown very disappointing results. Thus, Martin and Lewis (1949), reviewing 356 peptic ulcer inpatients after ten to fifteen years, concluded that 'medical treatment did not appear to have influenced the natural course of the disease' and that 'it is undeniable that medical treatment relieves the discomfort of most relapses, but from our present evidence we cannot believe that it is any protection against further trouble if this is destined by the ulcer'. The natural history of duodenal ulcer, however, varies greatly. Many run a relatively benign course for a limited period, finally healing and not recurring. Others have a progressively severe course with frequent complications and eventually (after seven to ten years) become unhealable. Martin and Lewis were dealing with hospital inpatients, i.e. presumably the worst of the ulcer population, and it seems now quite certain that their observations are unchallengeable when applied to chronic ulcers of years' duration. They are not, however, necessarily so in relation to ulcers with a short history in individuals without a strong ulcer diathesis, and these form a high proportion of the duodenal ulcers seen in practice and in hospital outpatient departments. If these early duodenal ulcers can be securely healed, many will remain healed, and it is in this group that medical treatment can be applied with the greatest hope of success.

In duodenal ulcers of more than seven years' duration, medical treatment is palliative and symptomatic and should be applied to relapses as and when they occur. In some of these patients relapses will gradually worsen and

become more disabling and in these the permanent relief offered by modern surgical methods should not be unduly delayed. In others, however, relapses are infrequent, mild and easily controllable by simple medical treatment, and partial gastrectomy is not strongly indicated. A long history is not necessarily an indication for gastrectomy. This depends upon the amount of disability caused by the relapses and their interference with the patient's working capacity and happiness. Every case has to be considered on its own merits.

ULCER DIETS

In the long-term management of ulcer patients it is important to see that treatment does not impose more of a burden on the patient than does the disease itself. This is especially so in regard to dieting. In Martin and Lewis's work it became clear that those patients who continued to relapse also continued to diet carefully. Most of those whose ulcers healed, being human, ceased to diet and did not relapse.

Certainly, during a smart relapse, when symptoms are severe, patients are more comfortable and lose their symptoms quicker when taking a light diet with plenty of milk. During remissions, however, they can and should eat practically anything they like. Ulcer patients readily develop food-faddism and hypochondriasis about food and it is important that doctors should not allow this to happen. They are also very inclined to attribute their latest relapse to some food taken shortly before and this idea again should be suppressed whenever possible. A melancholy cuisine of steamed fish, sieved vegetables and tapioca pudding should be imposed on nobody unless there are good grounds for supposing that it will avert relapses. These grounds are totally lacking, and permanent dietary regimes of this kind are obsolete and should disappear.

These views based on fact and not on theoretical possibilities, are slow to enter the general ambit of medical practice and for this doctors are not wholly responsible. The strict and permanent dietary treatment of patients who have had a duodenal ulcer has become a part of folk-lore. Patients obtain much of their advice from well-meaning family and friends and a more liberal outlook by their doctor is apt to be received politely but incredulously. Dietitians also have a vested interest in maintaining a mystique of ulcer dieting and their services should be avoided by ulcer patients.

THE TREATMENT OF RELAPSES

Many ulcer relapses are brief, and pain and discomfort are not severe. Bed treatment is likely to abbreviate all of them but clearly this has its limitations as it conflicts with the general principle that a duodenal ulcer should not be allowed to interfere with life more than is necessary, and many minor relapses are perforce treated in an ambulant patient who remains at work, by increasing the frequency of milk feeds between the main meals (which need not be changed) and by the two-hourly administration of an insoluble

antacid such as 'gelusil'. Alternatively, 'nulacin' tablets may be sucked continuously between meals. Very often temporary mild sedation with amylobarbitone sodium or phenobarbitone is helpful at these times and if in conversation with the patient a source of psychological stress can be discovered which has probably played a part in precipitating the relapse this should always be fully discussed with the patient. By this means many patients can be brought to understand the dominating influence that such factors have in initiating relapses and will more readily accept that minor dietary indiscretions played no part whatever. Fatigue should be relieved at these times and early bed and week-end rest enjoined.

Severe relapses require more vigorous action. Bed treatment is now necessary and may have to be carried out in hospital if it is impossible for the patient to be looked after at home. Pain and discomfort are lessened if the patient is put on a very light diet with 6-ounce (170 ml.) milk feeds two-hourly between the main meals and a suitable antacid given two-hourly alternating with the milk feeds. Regular sedation by day is desirable and a night sedative should also be given. Milk and antacid should be available at the bedside for the relief of night pain if it occurs. Anticholinergic drugs are often prescribed but their value is open to question. These drugs in full dosage can certainly reduce peristalsis in the body of the stomach to the point of virtual paralysis but their effect in reducing pyloric spasm is dubious and, in the presence of pyloric narrowing or spasm, the greatly diminished activity of the body of the stomach can produce a functional pyloric stenosis.

My own practice with severe relapses in hospital is to employ the continuous intragastric milk drip, using 6 pints (3.5 litres) of milk in the twenty-four hours and omitting all drugs other than sedatives. A light diet is taken in addition if desired (with the tube *in situ*), and 'gelusil' is at the bedside to be taken if and when pain occurs. The two aims of rest and neutralization of acid are well achieved by this method which is well tolerated by most patients and it is probably the quickest way of controlling ulcer pain.

Whichever method is employed the great majority of patients lose their pain within a few days—often in a few hours—and when this happens diet can be expanded and the milk drip discontinued. At this stage, provided that the patient's teeth are satisfactory, normal hospital diet can be given, excluding only fried food, pickles, curries, and the like, but milk feeds and two-hourly antacids are given between meals until the patient leaves hospital. The patient remains in bed except for toilet purposes throughout his stay in hospital and smoking should be actively discouraged. The duration of treatment depends upon the object to be achieved. With early ulcers it should be continued for six weeks to ensure full healing and the best chance of permanent cure. In established chronic ulcers, where the hope of permanent medical cure is small and it is judged that gastrectomy

is not yet advisable, the patient can be allowed home as soon as he has achieved full remission of symptoms and has been on a more or less normal diet for a week: i.e. in two to three weeks.

X-RAY EXAMINATION

In the case of early ulcers in which the hope of inpatient treatment is cure, whenever the films before admission have shown an ulcer niche in profile, the examination should be repeated at the end of the course and attention focused on the actual crater. The duodenal cap may or may not show deformity due to scarring and if this is present it will be permanent. This is relatively unimportant but disappearance of the ulcer crater itself is an important prognostic point. Conversely, if the crater persists then the ulcer has not healed, however well and symptom free the patient may be, and the likelihood of relapse is much greater. If the first examination did not show a definite crater, it is generally not worth while repeating it after treatment, and once the diagnosis of duodenal ulcer has been firmly established there is no object in repeating the barium meal at subsequent relapses. In general duodenal ulcers are x-rayed far more often than is necessary.

AFTER DISCHARGE

The duodenal ulcer patient in full remission should be allowed, and indeed encouraged, to take a normal diet with the exclusion only of fried foods, pickles, curries, spices (which should be permanently avoided). Meals, however, must continue to be taken at regular times and must not be rushed, and the practice of taking a milky drink midway between the main meals and again last thing at night should continue indefinitely. Patients should be told that 'it is much more important how you eat than what you eat'. The value of antacids during remission is dubious.

At this stage it is customary to enjoin that the patient's life must be regularized, that excessive commitments should be reduced, and all sources of psychological stress eliminated. It is important, however, to appreciate the very small influence that practitioners really can exert in this direction and also the complete inability of many ulcer patients so to modify their lives even when they concede the desirability of so doing. Certainly the practitioner must know about his patients' ways of life, his habits, and his worries and must be prepared to discuss them with him because without this the full rapport and confidence which are so important will be lacking. Patients should not be urged to change their jobs unnecessarily. It is easier to descend the social scale than to climb up it again, and it is most improbable that an ulcer which is destined to become chronic will be influenced materially by drastic alterations of this kind. Generally speaking, less exacting work means less pay and further anxieties.

One of my patients began his career as a master builder and by reason of his duodenal ulcer changed his work frequently, each time seeking less responsibility,

and each time descending the social scale. After seventeen years he had become an attendant in a municipal lavatory but he retained his troublesome ulcer. He was redeemed at this stage by gastrectomy but has so far not succeeded in bettering his circumstances.

'Learning to live with an ulcer' works only up to a point and sometimes is quite impossible and in these days of safe and readily available surgery it is generally better to adapt the ulcer to the conditions of life than the reverse.

RECENT ADVANCES

In August 1960, Truelove published the results of a carefully designed experiment in the therapeutics of duodenal ulcer in men. This took the form of a factorial experiment in which the effects of three different therapeutic measures were simultaneously compared. The three possibly useful agents were diet, phenobarbitone, and stilbœstrol; the design of the experiment required six months' unbroken treatment with assessment both clinically and radiologically at the end of the six months' period and again five years after the end of the period of treatment. The design and conduct of the experiment is difficult to criticize and the results unequivocal. In brief they are as follows:—

(1) Neither dieting nor phenobarbitone significantly affected the results either at six months or after five years.

(2) Stilbœstrol, in a dosage of 0.5 mg. twice daily, greatly improved the results both after six months and at the five year follow-up.

(3) The beneficial effect of stilbœstrol was striking in the group of ulcers of less than ten years' duration. In ulcers of longer than ten years' duration little if any benefit was observed.

(4) With one dubious exception *all* the cases in which the ulcer was seen to be radiologically healed at the end of the six months' treatment remained healed for the ensuing five years.

This work was by intention limited in scope but the outcome is clearly one of great interest. Much amplification requires to be done but none the less a door has been opened which was not open before. It must be recalled that up to this point no therapeutic agent whatever had been proved to influence the long-term course of duodenal ulcer. Apart from anything else the general impression is confirmed that no permanent benefit from medical treatment is likely to be seen in ulcers with a total history of more than ten years, but that in the more recent ulcers, if secure healing can be obtained it is often permanent. Medical treatment therefore demonstrably does affect the natural course of an ulcer *in its earlier stages* and the therapeutic nihilism of Martin and Lewis and of other authors is seen to be justified only in relation to long-established chronic ulcers, and in this group it need occasion no surprise.

It is not yet known how stilbœstrol exerts its action. It might do so by improving the healing capacity and the resistance of mucosa or it might do so by reducing either the bulk or the response of the gastric secretory cell mass. Treatment with stilbœstrol is far from ideal as the other normal effects of œstrogens appear in most cases, but it is possible that related

substances may already exist, or may be synthesized before long, in which the effect on ulcer healing is retained and the feminizing action minimized. Clearly at the present time there are many duodenal ulcers in the population which will never be amenable to permanent medical cure and many of these will be brought to surgery, but in years to come if there can be greater concentration of effort on the comparatively recent cases, and if secure healing of a high proportion of these can be achieved, there are grounds for real optimism for the future.

THE INDICATIONS FOR PARTIAL GASTRECTOMY

An uncomplicated duodenal ulcer with a total history of less than five years should almost never be operated on. Within this period every effort should be made to get it to heal by medical means. After five years the situation is different. If regular relapses now continue they will go on doing so and the only prospect of permanent cure is offered by surgery. Whether or not this is advised depends entirely on how much trouble the ulcer is causing and the point must be decided on the merits of the individual case. Some ulcers run benign courses with relapses which are brief and easily controlled by simple ambulatory methods; complications are infrequent and symptoms do not tend to worsen as the years pass by. In some of these gastrectomy never will be indicated. In others, however, of the 'over five year' group, symptoms tend gradually to become more frequent and more troublesome and provided that there are not strong bodily or psychological contraindications the decision to refer the case for surgery should not be long delayed.

The dictum that 'patients should earn their gastrectomies' sounds perhaps a little harsh, but the words have a ring of truth about them. The most grateful post-gastrectomy patients are those who have been relieved of a troublesome and genuinely painful ulcer. Conversely the number of those with disabling post-gastrectomy symptoms contains an unduly high proportion of patients operated on too early or with too mild symptoms.

PERSONALITY AND SURGERY

Duodenal ulcer patients comprise a wide variety of psychological types. The idea that they consist almost entirely of ambitious, aggressive, tense, hard-driving people is false. Some indeed are of this type but the majority would pass as 'normal'. The spread of personality is very wide and as a group they are certainly not a neurotic population. Among them, however, as would be expected, are a number of highly neurotic individuals—psychopaths, anxiety states, mild depressives and hysterics. When gastrectomy is being considered traits of this kind must be very carefully assessed because the postoperative results in this group are poor. The difficulty is to know how much trouble the ulcer really is causing. Ulcer pain, being entirely subjective, is always difficult to assess and in some patients is

impossible. Good x-rays here are extremely helpful; the man who complains of unendurable ulcer symptoms and whose duodenal cap shows no more than a tiny fleck of barium with minimal distortion of its outline is probably exaggerating his symptoms. A film showing a definite crater with gross deformity from scarring is valuable evidence in support of severe symptoms. In these cases first-class x-rays are very important. No doctor who has not had practical experience of radiology can appreciate the technical problems involved in the securing of really good films of a difficult duodenal cap. Apart from technique, much time and trouble are required, and the great masters of this art are not numerous.

Much more rarely one encounters patients whose gross psychiatric abnormality is directly due to the pain and distress caused by an undiagnosed or wrongly assessed ulcer.

One of mine had twice been certified for depressive psychosis which, in common with her abdominal pain, was not relieved by electroconvulsive treatment. A barium meal had shown 'some deformity of the duodenal cap, but no ulcer crater'. At operation she was found to have a large posterior duodenal ulcer penetrating the pancreas. Her gastrectomy was a brilliant success, relieving not only the ulcer pain but also the depression.

Another, a previously robust and successful man, developed an anastomotic ulcer following a technically imperfect gastrectomy for duodenal ulcer. This recurrent ulcer caused much pain and disability but was never seen at x-ray. He was regarded as a case of depression and treated with electroconvulsive therapy. Significance was attached to his wife's comparative success as a businesswoman in causing feelings of inferiority and depression. His anastomotic ulcer was clearly visible at gastroscopy and surgery restored him to complete normality.

It is therefore important to bear in mind that the psychological make-up of the patient and his ulcer symptoms bear on one another and that undue preponderance of one or the other may make for difficult judgment.

I have dwelt on this matter at some length because the decision to advise gastrectomy is a major and irreversible one. The results of gastrectomy are nowadays very good and anastomotic ulcer is becoming rare, but the incidence of other post-gastrectomy syndromes is appreciable and once fully established they are apt to be permanent and incapacitating. Good gastrectomy results imply not only good surgical technique but also good judgment in selection of cases, and the responsibility for this is as much that of the general practitioner and the physician as of the surgeon.

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THE SURGICAL TREATMENT OF CHRONIC PEPTIC ULCERATION

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IT is more difficult to advise about operation than it is to perform it, for the surgeon can readily train himself to master the mechanics of the job. There is, indeed, some danger that manual dexterity and love of craftsmanship may weigh the scales too heavily in favour of surgery, for the risk to life of operation is today so small. On the other hand, unreasoned faith of the physician in medicine and diet, or prejudice on his part, may deny the patient benefits that surgery can undoubtedly confer when correctly applied.

PRESENT TRENDS

As a result of the literary outcrop of the past decade on the subject of post-gastrectomy or 'dumping' syndromes, which has recently been admirably reviewed by Illingworth (1960), there is a noticeable trend away from surgery at the present day. There is, however, much evidence that surgery *per se* is not to blame for the frequency of the occurrence of the dumping syndrome. The fault would seem sometimes to lie in the mind of the surgeon, skilled operator though he may be. Glazebrook and Wrigley (1952) have exposed facts which make this a fair assumption. They make the very disturbing observation that 'some of the most severe cases of post-gastrectomy syndrome are met with in patients who, so far as can be made out, have never had a duodenal ulcer at all, the x-ray sign of a deformed duodenal cap being taken as sufficient evidence to justify partial gastrectomy'.

Such injudicious surgical activity recalls the days following the 1914-18 War, which had imparted such impetus to surgery. Gastroenterostomy became almost a routine treatment for duodenal ulceration with results which moved the late Sir Arthur Hurst to observe that 'the commonest gastric disorder in London today is gastroenterostomy'. This observation was to some extent borne out by the new surgical industry of 'unpicking' gastroenterostomies, and, what was worse, of partial gastrectomy for the cure of gastro-jejunal-colic fistula. The shortcomings of gastroenterostomy led to the more radical Polya operation—partial gastrectomy followed by end-to-side gastrojejunostomy—popularized in Great Britain by those who had had the opportunity of studying in Vienna and elsewhere in Central Europe. Immediately before the 1939-45 War, and to a greater extent since, this procedure has tended to take the place of gastroenterostomy as a

routine. Although it is a far more reliable cure of ulceration, it has been found that the loss of ulcer pain is but a poor compensation for the suffering following operation which occurs in a substantial proportion of cases. The mounting toll of post-gastrectomy sufferers led to the search for a less radical means of affording relief, and to the advocacy by Lester Dragstedt of vagotomy for duodenal ulcer—at first alone, and later, in order to anticipate the resulting stasis, in association with a drainage procedure such as gastroenterostomy, pyloroplasty, partial excision of the pyloric sphincter, or excision of the pyloric antrum (a modified partial gastrectomy). The attempt to employ vagotomy also for gastric ulcer was based on false premisses, and has been rightly abandoned. The operation of ligation of the gastric vessels enjoyed a brief but limited popularity some years ago, and happily the pyloroduodenectomy operation followed by irradiation of the stomach designed to reduce acidity has gained no foothold whatsoever in this country.

The Billroth I operation—partial gastrectomy followed by gastro-duodenostomy—has been widely accepted as being preferable to the Polya for chronic ulcers of the stomach, and is now the operation of choice.

THE RATIONALE OF OPERATION

The mind of the surgeon should not be obsessed with the treatment of ulceration, but should be orientated to the needs of the individual patient. How can he best help the latter to overcome his disability? The first desideratum is to recognize that gastric and duodenal ulcers are distinct clinical and etiological entities, requiring different concepts of treatment.

GASTRIC ULCER

So far no causal anomalies of gastric secretion capable of being corrected by surgery have come to light, and the surgical approach here is simple. The ulcer-bearing portion of the stomach should be removed. Such operations as wedge-excision of the ulcer and sleeve resection, popular many years ago, have proved unreliable. To achieve success the pylorus must be taken, and the only operation which has stood the test of time and experience is resection of the stomach from a point just proximal to the ulcer, with restoration of continuity by a gastro-duodenostomy. The intractable ulcer situated high on the lesser curve—fortunately a comparatively rare condition—poses a difficult problem, and opinions differ as to the best operation. Many surgeons of experience have recourse to gastrectomy from a point *distal* to the ulcer. My own preference is the removal of the ulcer together with the lesser curve and the pylorus, but with preservation of the major portion of the body of the stomach, fashioned as a tube for anastomosis to the duodenum. Chronic ulceration producing stenosis at the gastro-œsophageal junction may necessitate the operation of œsophago-gastrectomy.

DUODENAL ULCER

The constant etiological factor in early duodenal ulceration is a high acidity, probably associated, as recent investigations are tending to show, with an excessive output of proteolytic enzymes. The objective of surgery is permanently to reduce these excessive secretions. Excision of the ulcer-bearing area of the duodenum is of secondary importance. The possibilities are either wide partial gastrectomy of the Polya type, or vagotomy associated with a drainage procedure. The acidity is further reduced if vagotomy is combined with excision of the pyloric antrum, a method which appears to be gaining in popularity, but which, in my opinion, is too ruthless a procedure, as the almost complete achlorhydria which such a combined operation achieves may have a very serious late nutritional aftermath: even perhaps predisposing to cancer. Wangensteen (1952) recommends pyloroplasty followed by removal of practically the whole of the body of the stomach leaving a fringe at the cardiac end which is anastomosed to the pyloric antrum. Deloyers (1956) advocates what he terms 'reversed gastrectomy': the major portion of the body of the stomach, including the cardia, is removed, and continuity restored by anastomosing the œsophagus to the pyloric antrum. He claims that this procedure is valid for all localizations of the ulcer—cardiac, lesser curvature, antral, duodenal and jejunal ulcers. Neither Wangensteen's nor Deloyers' operation has found favour with British surgeons.

The amount of stomach removed in the Polya operation for chronic duodenal ulcer differs markedly in different centres. In some it is so extensive that only the first vas brevis artery is left. Most surgeons, however, are less radical than this. Our own practice is to divide the stomach at the point on the greater curvature corresponding with the inosculation of the left gastro-epiploic artery with the right gastro-epiploic artery. Pulvertaft's (1952) investigations suggest that the incidence of post-prandial symptoms is directly proportional to the amount of stomach removed, except for regurgitation of bile, which appears to be inversely proportional. The degree of permanent weight loss is undoubtedly related to the extent of the resection.

COEXISTENT DUODENAL AND GASTRIC ULCER

Duodenal ulcer and gastric ulcer have coexisted in 7 per cent. of our own cases. The former always comes first, and the interval between its onset and the development of the gastric ulcer is usually many years, by which time the capacity for excessive production of acid has waned, and is no longer the problem at issue. Partial gastrectomy of the Polya type is undoubtedly the appropriate operation for this double lesion.

ANASTOMOTIC ULCERATION

Anastomotic ulcer following gastroenterostomy or partial gastrectomy will nearly always require surgical treatment. It is generally considered that a

Polya partial gastrectomy should be performed for ulceration at the stoma following gastroenterostomy. For that which follows partial gastrectomy, the operation of choice is vagotomy, together with refashioning of the gastrojejunostomy stoma should this be necessary.

ZOLLINGER-ELLISON SYNDROME

This rare syndrome (Zollinger and Ellison, 1955) is characterized by intense hypersecretion by the gastric mucosa as the result of the presence of an alpha-cell tumour of the pancreas, and may explain an inveterate tendency to recurrent ulceration despite ruthless surgical procedures. It is well to bear the condition in mind, and to palpate the pancreas at operation in all patients who show abnormally high secretion values preoperatively, and in all cases of recurrent ulceration following operation.

THE APPLICATION OF SURGERY IN GASTRIC ULCER

A distinction should be made between ulcers on the lesser curve proximal to the pyloric antrum, and ulcers close to the pylorus. The reason is that ulcers in the former situation become malignant so very rarely that the risk of this complication can, in our opinion, be ignored. Ulcers within the pyloric antrum, however, may become malignant. What is worse is that sometimes it is impossible to say, short of microscopy, whether such an ulcer is simple or malignant despite all the diagnostic measures at our disposal, including gastroscopy and cytology. A French surgeon put it that ulcers in the vertical part of the stomach are always simple, and remain so; ulcers in the horizontal portion are always suspect. Our own experience amply confirms this view. Occasionally in the pyloric antrum one meets with multiple ulcers which yield a history atypical for ulcer; sometimes simple ulcers may develop on the greater curvature of the pyloric antrum. In short, the pyloric antrum in respect of ulceration behaves differently from the stomach proximal to it, and demands special consideration. If there is any doubt whatsoever about the nature of the ulcer, as there so often must be, and if the history is an atypical one for ulcer, then early operation is desirable.

Ulcers on the lesser curve proper pose a more difficult problem in respect of indications for operation. If they have bled either symptomatically or insidiously, decision should be in favour of operation, but in those who have not exhibited these complications there can be no certain guide. It goes without saying that determined medical efforts, in the widest sense—i.e. rest, diet, attention to environment—must be made before surgery is even contemplated. The late John Ryle used to say: 'Five years' history, five hours' delay, and less than five c.c.s of free hydrochloric acid in the resting juice', and there is little to find fault with in this. There are, however, many matters to be considered in each individual case before the plunge is taken: e.g. the intractable nature of the ulcer, the degree of pain,

the frequency of recurrence after apparent healing, the patient's age and economic circumstances. All these, of course, are also relevant when one is dealing with a duodenal ulcer patient. No rules can be made, but it should be borne in mind that for most cases of lesser-curve ulcers the risk of operation is a small one, and the results are usually satisfactory if the correct selection is made—the patient is freed from pain and freed from fear, though it must be admitted that not all patients thrive postoperatively as well as one would wish.

The treatment of hour-glass deformity—a very rare event today—is partial gastrectomy. The optimum treatment of pyloric obstruction due to fibrosis from a giant ulcer on the lesser curve in the older age-group is probably a simple posterior gastroenterostomy.

THE APPLICATION OF SURGERY IN DUODENAL ULCER

Here one is not only faced with making the decision to operate in the free and uncomplicated duodenal ulcer, but also faced with a choice between operative procedures. First, the decision to operate. It goes without saying that the question of operation should not arise until proper medical care—again in its widest sense—has failed to prevent recurrences. Duodenal ulcer is a disability of the young man and, to an increasing extent today, of the young woman. In many cases marked psychological aberrations coexist, and by and large such patients are unsuited to operation, for it is they who would seem to be particularly liable to develop digestive upsets as the result of operation. If doubt exists, it is preferable to reject operation, or at least to temporize. Physicians and surgeons rarely submit to it themselves! Though perhaps it may be argued that they belong to a more privileged section of the community than do the majority of hospital patients, and being more enlightened in this respect are able to take better medical care of themselves.

One of the late Sir Gordon Gordon-Taylor's *obiter dicta* was 'The patient must earn his operation'. There is a wealth of wisdom here. What Gordon-Taylor implied was that the patient should have suffered over a considerable period of time, and during that period endeavoured by regimentation and self-denial to get rid of his recurring symptoms. If one operates too early, even minimal postoperative symptoms will cause dissatisfaction and a disgruntled patient. The operation will be a failure. The preoperative history will have been too short to have burnt itself into his memory, and he cannot therefore balance judicially relief from pain with postoperative discomfort. The patient who has not attempted to take care of himself before operation is even less likely to do so after operation—and this may, and often does, lead to disaster. A good test of the patient's desire to get well, and of his will to cooperate in order to do so, is to ask the addicted cigarette smoker—and many ulcer patients are so addicted—to renounce the habit before the surgeon consents to operate. Although at all times

one must regard each patient on his own merit, in the younger age-group it is usually unwise to operate less than six years or so after the initial onset of symptoms.

In the many patients who exhibit a pronounced anxiety complex, or who give evidence of an unstable mentality, the services of a psychiatrist should be sought before operation is performed. It must be conceded, however, that in some such patients operations have done much to restore their mental health, and their ability to face up to everyday responsibilities. Such considerations do not apply quite so forcibly to duodenal ulceration in the older age-groups—i.e. 40 or over. For the most part, men and women at this age have become adjusted to their circumstances, and their mental outlook is likely to be more stable.

CHOICE OF OPERATION

As regards the choice of operation between partial gastrectomy and vagotomy, it may be said at once that partial gastrectomy in the young man or woman is to be condemned in principle. It reduces what has been called the 'energy potential' at a time of their life when they are most in need of it. This applies particularly to the manual labourer. An experienced Canadian once informed me that no trapper or lumberjack—in both of which occupations duodenal ulcer is common—is able to return permanently to his occupation after gastric resection. In my opinion the operation of choice at the present time for the younger age-group, having ascertained that the gastric secretion values are high, is vagotomy, coupled with a drainage operation. For the past eleven years I have used a posterior gastroenterostomy as the standard drainage procedure, and results on the whole have been satisfactory.

In a survey made eighteen months ago of 100 consecutive operations, none less than two years old at the time of the survey, 96 of the patients were found to be at work. There was one postoperative death. In 18 cases vagotomy was incomplete as assessed by a postoperative insulin test meal, and of these, five are recorded as being unsatisfactory. Three of them have had further operations.

It goes without saying that an essential adjunct to success is complete division of both nerves. This is not always achieved with certainty even in experienced hands, and to reduce the risk of failure, Burge and Vane (1958) have introduced an ingenious electrical recording instrument designed to confirm total section.

Excision of the anterior half of the pyloric sphincter as an alternative to gastroenterostomy appears to give equally satisfactory results. Surgeons who practise it are satisfied that the operation is less disturbing than is gastroenterostomy, and equally efficient as an adjunct to drainage.

For the older man—the man of 50 or so—with a large and adherent ulcer and a long history of ulcer pain, I still prefer a Polya gastrectomy on the grounds that the indirect attack may prove inadequate. In the obstructed

case, if the acid is low, and especially in older patients, a simple gastroenterostomy may be all that is required.

THE PERFORATED ULCER AND SURGERY

Although partial gastrectomy for perforated chronic gastric ulcer is a sound procedure if the technical difficulties in performing it are not forbidding, simple closure of the ulcer is probably a better alternative in principle and is best suited to the majority of patients. This applies also in the surgical management of the perforated duodenal ulcer, although Taylor and Warren (1956) report good results from non-operative treatment. Partial gastrectomy should not be performed for this condition save in exceptional circumstances.

MASSIVE ULCER HÆMORRHAGE AND SURGERY

Personal experience, strengthened by discussions with medical and surgical gastroenterologists, justifies the opinion that otherwise well patients of middle-age and over admitted to hospital because of a massive hæmorrhage from a known chronic ulcer should be prepared for operation, which is best performed when the blood pressure is restored. The risk to life of operation at this stage is not great, but the risk of an immediate further hæmorrhage is considerable in this age-group, and should be anticipated by surgery, for at worst it may be fatal; at best, it will impel an operation when the patient's condition has deteriorated to an extent which increases the operative risk. If the source of the bleeding is a gastric ulcer, resection is indicated. If the bleeding comes from a duodenal ulcer, resection to include the ulcer, which is usually large posterior and adherent, is likely to be too hazardous, and probably the best plan is to open the duodenum, expose the responsible vessel, and occlude it by underrunning with a stitch. The pylorus is then closed by a simple infolding suture, and a posterior gastroenterostomy performed.

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THE DIAGNOSIS AND MANAGEMENT OF UPPER GASTRO-INTESTINAL BLEEDING

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Despite many significant advances in treatment, gastro-intestinal hæmorrhage remains one of the most serious of medical emergencies and still carries an appreciable mortality, particularly in the elderly. Recently, interest has centred around methods by which early diagnosis of the causal condition can be made so that appropriate treatment, particularly surgery, can be speedily undertaken.

CAUSES OF GASTRO-INTESTINAL BLEEDING

The two representative series in table I show that hæmatemesis or melæna can be due to a diversity of causes.

The mammoth series of Jones and Gummer (1960) includes 2,526 patients admitted to the Central Middlesex Hospital between 1940 and 1957 and is contrasted with a smaller series of 438 patients admitted to Leeds hospitals between 1953 and 1958 (Chandler and Watkinson, 1959; Cantwell, 1960).

It will be seen that 88 per cent. of the London and 94 per cent. of the Leeds series were due to some type of peptic ulceration, the proportions due to gastric, duodenal and acute ulceration being essentially similar in the two towns. Gastric carcinoma and portal hypertension proved uncommon causes of bleeding in both series, each condition accounting for only 2 to 3 per cent. of all patients.

The rarity of bleeding due to œsophageal varices in England contrasts markedly with its frequency in the United States, Welch and his colleagues (1955) reporting that one-third of the cases admitted to a Boston Hospital with gastro-intestinal bleeding were ascribed to this cause.

Jones and Gummer (1960) give an impressive list of rare causes encountered in their vast experience, including trauma, general medical diseases such as hypertension, uræmia or collagen disease, neurological diseases such as cerebral vascular accidents, blood diseases inducing a hæmorrhagic state, rare simple and malignant tumours of the gastro-intestinal tract, alimentary diverticuli, local vascular lesions such as atherosclerosis or telangiectasia, following trauma or burns or induced by drugs such as aspirin, phenylbutazone, steroids or anticoagulants.

Efforts should be made to establish the nature of the causal condition as soon as possible since management will vary appreciably in relation to it. To this end a careful history and clinical examination are valuable, but not

always conclusive, so that additional measures such as early barium meal examination, gastric aspiration and endoscopy may be necessary (Watkinson, 1955).

HISTORY

The history may prove difficult to obtain in a collapsed and sometimes disorientated patient; in such circumstances questioning of an informed

	Central Middlesex Hospital 1940/57*		Leeds General Infirmary 1953/58**	
	Number	Percentage	Number	Percentage
Chronic gastric ulcer	423	16.9	64	14.6
Duodenal ulcer	844	33.7	158	36.1
Postoperative group	168	6.7	13	2.9
Acute ulcer	720	28.8	158	36.1
Hiatus hernia	47	1.8	19	4.3
Total peptic ulcer	2,202	87.9	412	9.40
Carcinoma of stomach	57	2.2	9	2.1
Portal hypertension	75	3.0	8	2.0
Other causes	96	3.8	5	1.1
Unclassified	96	3.8	4	1.0
Total	2,526	100	438	100

* Jones and Gummer (1960). **Chandler and Watkinson (1959) and Cantwell (1960).

TABLE I.—Causes of gastro-intestinal bleeding.

relative will prove valuable. Chronic peptic ulcer is suggested by its typical periodic pain, although the absence of this symptom does not exclude the diagnosis. Recent dyspepsia, anorexia and weight loss suggest neoplasm, whilst the cirrhotic patient may give a history of alcoholism, jaundice or abdominal distension. Acute ulceration is usually not preceded by any dyspeptic symptoms, and a causal factor, such as trauma, infection, or the ingestion of aspirin or a steroid may be identified: the taking of salicylate preparations is so widespread and commonplace that the information will seldom be volunteered unless the patient is questioned specifically about it.

By direct questioning, Alvarez and Summerskill (1958) found that 49 of 103 patients admitted to a London hospital with hæmatemesis and melæna had taken a salicylate preparation in the twenty-four hours preceding the hæmorrhage, as compared with only seven of a group of matched controls admitted for other reasons.

Symptoms of some general medical condition, such as hypertension, uræmia or a hæmorrhagic state, may be elicited. Œsophageal tears induced by the strain of vomiting (Mallory-Weiss syndrome) are perhaps more common than is generally realized and are suggested by a history of initial vomiting followed by hæmatemesis.

EXAMINATION

The degree of shock and blood loss should first be assessed by noting the presence of pallor, sweating and restlessness, and by recording pulse and blood pressure hourly: a sustained or sudden hypotension or tachycardia indicates that hæmorrhage is continuing or has recurred. The patient

should be rapidly examined for purpuric or telangiectatic lesions; for evidence of atherosclerosis, hypertension or bronchitis; for jaundice, spider nævi, red palms and hepatic fœtor which might suggest hepatic cirrhosis; indeed, for evidence of any general medical condition which might be causing bleeding.

Abdominal examination should be undertaken carefully and is often rewarding. Local tenderness over an ulcer may be all that is found but occasionally guarding and board-like rigidity will indicate that an associated perforation has developed. Hepatosplenomegaly, with or without ascites, will suggest portal hypertension. An abdominal tumour due to a gastric neoplasm or its secondaries may be felt.

Attempts to gauge the degree of blood loss pathologically are unreliable: a hæmoglobin taken routinely on admission may be fallaciously high as hæmodilution may not have taken place. Significant early elevation of blood urea is evidence of severe dehydration and blood loss, provided renal disease has been excluded. Determination of urinary pepsinogen levels (Janowitz *et al.*, 1950; Sircus, 1954) and determination of bromsulphthalein dye uptake may yield additional information, but such facilities are not always available.

EARLY BARIUM MEAL

As long ago as 1937, Hampton suggested that the cause of gastro-intestinal bleeding might be identified by early radiological examination. Clinicians and radiologists, however, remained reluctant to x-ray patients who had recently bled, fearing that recurrent hæmorrhage might be induced and that the collapsed state of the patient precluded adequate examination. The value of the method was re-emphasized in the United States by Zamcheck and his colleagues in 1952 and 1955 and in this country by Cantwell (1957, 1960) and by Chandler and his colleagues (1960) who showed it to be diagnostically useful and relatively free from risk to the patient.

In the technique evolved by Cantwell (1957) the patient is x-rayed in his bed as soon as possible after resuscitative measures have been completed.

Food is withheld for two hours, after which the patient is laid on a film cassette (15 × 12 inches [38 × 30 cm.]) which reaches down to the iliac crest. He then swallows five ounces (142 ml.) of thin barium emulsion and is rolled on his right side for a few minutes. He then swallows a small amount of thick barium which outlines the œsophagus, and immediately afterwards two films are taken in the antero-posterior and prone left-oblique positions. The lower œsophagus and stomach are usually well visualized on the antero-posterior film and the duodenal loop in the oblique prone projection, and yield valuable information in the majority of patients examined.

The results obtained by the use of early radiography in upper gastro-intestinal bleeding are summarized in tables II and III, in which the data of Cantwell (1960) from Leeds and of Chandler and his colleagues (1960) from London are contrasted in 350 patients so investigated.

In table II the reliability of the predicted radiological diagnosis is assessed, and proved to be correct in 80 per cent. of the Leeds, and 83 per cent. of the London, series. In approximately 20 per cent. of the patients examined false-positive radiological findings were reported which could not be subsequently confirmed. The

demonstration of chronic gastric ulcer craters proved reliable in between 75 per cent. and 88 per cent. of cases, but could not be found later in seven patients. Duodenal ulcer craters or deformity correctly indicated an ulcer in 85 to 96 per cent. of subjects. A normal x-ray suggesting that an acute ulcer had been the cause of the bleeding proved correct in 68 to 73 per cent. of examinations, the remainder subsequently being shown to have other causal conditions. Hiatus hernia was

Predicted radiological diagnosis	Number diagnosed	Confirmed	Incorrect thus providing false diagnostic information
Gastric ulcer	(A) 25	22 (88)	3 (12)
	(B) 16	12 (75)	4 (25)
Duodenal ulcer	(A) 69	65 (85)	4 (15)
	(B) 54	52 (96)	2 (4)
Acute ulcer (Negative examination)	(A) 74	50 (68)	24 (32)
	(B) 72	53 (73)	19 (17)
Hiatal hernia	(A) 11	11 (100)	0
	(B) 4	3	1
Carcinoma of stomach	(A) 6	3	3
	(B) 2	2	–
Œsophageal varices	(A) 7	6	1
	(B) 2	2	–
Others	(A) 8	3	5
	(B) –	–	–
Total	(A) 200	160 (80)	40 (20)
	(B) 150	124 (83)	26 (17)

Percentage incidence in parentheses.
(A) Data of Cantwell (1960). (B) Data of Chandler *et al.* (1960).

TABLE II.—The value of an emergency barium meal in the diagnosis of hæmatemesis as shown by the accuracy of the predicted radiological diagnosis.

correctly identified in all save one instance whilst the extremely valuable prediction that nine patients had œsophageal varices proved reliable on eight occasions. Gastric carcinoma was over-diagnosed, blood clot possibly simulating filling defects.

If the data are considered in another way, namely, by relating the final causes of bleeding to the predicted radiological diagnosis, as in table III, the frequency with which lesions were missed becomes apparent.

The correct diagnosis was predicted in exactly similar proportions in both series, namely in 83 per cent., duodenal ulceration and acute ulcers being correctly diagnosed in four out of every five patients examined. Chronic gastric ulcers were more readily identified in Leeds (92 per cent.) than in London (60 per cent.). Eight of ten patients bleeding from varices, and fourteen of sixteen patients with hiatus hernia, were recognized radiologically. The diagnosis of carcinoma of the stomach presented the greatest diagnostic difficulty, being correctly diagnosed in only three of seven patients.

Early emergency barium meal examination therefore emerges as an informative and safe investigation, causing little discomfort to the patient and providing diagnostic information in four out of every five patients studied. Its greater use is advocated.

GASTRIC ASPIRATION

Following the suggestion made by Kinsella in 1950, Chandler and Watkinson (1953, 1959) studied a group of 238 patients with gastro-intestinal bleeding

by introducing a Ryle's tube on admission and undertaking hourly aspiration of samples of the gastric contents. Examination of the aspirated specimens proved of value in two ways. First, by noting at the bedside whether specimens were clear or bloodstained, evidence of arrested, continued or recurrent hæmorrhage was obtained, whilst clear specimens in a patient with melæna suggested a duodenal site for the bleeding. Secondly, by

Final diagnosis	No. of patients	Radiological diagnosis correct	Lesions missed
Gastric ulcer	(A) 24	22 (92)	2 (8)
	(B) 20	12 (60)	8 (40)
Duodenal ulcer	(A) 82	65 (79)	17 (21)
	(B) 61	52 (85)	9 (15)
Acute ulcer	(A) 62	50 (81)	12 (19)
	(B) 60	53 (88)	7 (12)
Hiatal hernia	(A) 12	11	1
	(B) 4	3	1
Œsophageal varices	(A) 7	6	1
	(B) 3	2	1
Carcinoma of stomach	(A) 5	1	4
	(B) 2	2	–
Others	(A) 8	8	–
	(B) –	–	–
Total	(A) 200	163 (82)	37 (18)
	(B) 150	124 (83)	26 (17)

Percentage incidence in parentheses.
(A) Data of Cantwell (1960). (B) Data of Chandler *et al.* (1960).

TABLE III.—The value of an emergency barium meal in the diagnosis of hæmatemesis as shown by comparing the final diagnosis with the radiological diagnosis.

studying gastric secretory patterns through the initial twenty-four-hour period after the bleeding, useful diagnostic information emerged in that acid secretion tended to be suppressed following bleeding from acute ulcers and maintained after bleeding from chronic ulcers.

Thus, achlorhydria enabled the diagnosis of acute ulcer to be correctly predicted in 88 per cent. of patients thought to have bled from this source, high nocturnal activity values correctly indicated a bleeding chronic duodenal ulcer in some 84 per cent. of patients, whilst low nocturnal acidity values with acid secretion through the day indicated a chronic gastric ulcer in 79 per cent. of patients bleeding from this source.

The fact that the test involves some discomfort to the patient, that twenty-four hours may elapse before a diagnosis can be made and that comparable results are obtained by an early barium x-ray limits the application of this method, particularly as Chandler and his colleagues (1960) failed to obtain as convincing results in a subsequent study. It is of particular value, however, in indicating continued or recurrent bleeding.

EARLY ŒSOPHAGOSCOPY AND GASTROSCOPY

Gastroscopy, shortly after resuscitation has been completed, seems a reasonable procedure and its use has been advocated by Palmer (1954) and more recently by Chandler and his colleagues (1960). When performed by a

suitably trained endoscopist, a lesion is often visualized and it may be possible to examine the lower œsophagus to exclude varices or œsophago-gastric tears. Occasionally the view is obscured by blood on the objective and, if examination is inconclusive, an emergency œsophagoscopy may have to be undertaken.

Combined investigation.—Combined investigation in the initial twenty-four-hour period by overnight aspiration followed by gastroscopy and an emergency barium meal the next morning has been advocated by Chandler and his colleagues (1960), and enabled a correct diagnosis to be established in 77 per cent. of 75 patients so examined. These results seem so little better than those obtained by an early barium meal alone, however, that they do not appear to justify the extra labour involved or the additional discomfort to which the patient is subjected.

GENERAL MEDICAL MANAGEMENT

All patients with a significant hæmatemesis or melæna should be admitted to hospital. In the case of severely shocked patients it may be necessary to raise the foot of the bed. The patient should be reassured and mental relaxation obtained by an injection of phenobarbitone sodium, 3 grains (200 mg.), or, in all severe cases, by morphine, $\frac{1}{4}$ grain (15 mg.). The pulse and blood pressure are recorded hourly and blood is removed for hæmoglobin estimation, grouping and cross-matching.

The necessity for transfusion should first be assessed on clinical grounds by serial observation of pulse and blood pressure but a hæmoglobin below 60 per cent. is an absolute indication for transfusion. The amount of blood to be given and its rate of administration will depend upon the patient's condition and should be adjusted to keep pace with the blood loss. In severe bleeding it may be necessary to insert two drips to maintain the circulatory state, though such a procedure is usually a prelude to surgery.

The patient should be encouraged to drink water or dilute saline liberally and should be started immediately on a semi-solid diet with two-hourly feeds night and day. Adequate amounts of ascorbic acid should be given in tablet or liquid form. Antacids, such as aluminium hydroxide suspension, should be given two-hourly, as they exert both a useful antacid and anti-peptic action. Sedatives may be required to ensure adequate sleep. Constipation often follows bleeding, but aperients and enemas should be avoided if possible; a suppository is usually adequate to promote bowel action. Once bleeding has ceased early mobilization is desirable and is without adverse effect. In desperate cases gastric lavage is sometimes beneficial and a milk drip may be useful in controlling intractable pain. In some patients bleeding continues or recurs on this medical regime and surgery has to be undertaken.

SURGERY IN HÆMATEMESIS

Surgery is being used increasingly in the control of gastro-intestinal bleeding and is indicated when: (1) a chronic peptic ulcer is known, or strongly

suspected, to be present; (2) bleeding is uncontrollable or recurrent despite medical treatment; (3) the patient is elderly; (4) associated disease is present; (5) a large gastric ulcer has been demonstrated in the past. The most important of these factors is the age of the patient.

In the Central Middlesex Hospital series (Jones and Gummer, 1960) the mortality rose from 3.3 per cent. between the ages of 45 and 60, to 16.3 per cent. over 65, 22.7 per cent. over 75 and 46.7 per cent. over 85 years.

The presence of associated atherosclerosis, hypertension and other medical conditions in the 'over 85' age-group is partially responsible for this change. If a chronic peptic ulcer is known or suspected to be present in this age-group, operation should not long be delayed, particularly if the ulcer is known to be gastric, large or penetrating.

If at laparotomy a chronic ulcer is found a rapid partial gastrectomy should be undertaken. Ligation of the surrounding blood vessels or infolding the ulcer have not proved to be reliable measures for the control of bleeding and recurrence is not prevented. If no ulcer can be palpated three alternatives present themselves to the surgeon. (i) He may do nothing, which is to be deprecated. (ii) He may perform a high partial gastrectomy in the hope of removing the area of bleeding acute erosions but these may still be present in the gastric remnant and no benefit may be obtained. (iii) It seems most desirable to open the stomach along the greater curvature and to try to identify the bleeding point within the stomach.

By this method, on two occasions in Leeds in the last year, mucosal tears at the gastro-œsophageal junction which were causing exsanguinating hæmorrhage, were readily identified and sutured and would certainly have been left behind if a high gastrectomy had been performed blindly.

If an extensive area of erosion is found, partial gastrectomy can then be undertaken to include this area. Bohn (1949) has recommended local mucosal excision of single acute ulcers but this method does not seem to have achieved universal popularity.

The adoption of a more active and vigorous surgical policy in hæmatemesis has substantially reduced the mortality, particularly in the elderly, in the many centres in which it has been advocated and enthusiastically pursued (Jones and Gummer, 1960; Lewin and Truelove, 1949; Tanner, 1954a; Cates, 1959).

HÆMATEMESIS DUE TO PORTAL HYPERTENSION

Bleeding from œsophageal varices in hepatic cirrhosis with portal hypertension is usually severe and exsanguinating and often precipitates jaundice and hepatic coma. Until recently it carried an alarmingly high mortality, but the use of an œsophageal compression balloon (Sengstaken tube), coupled with a better understanding of the management of hepatic coma, has materially reduced the death rate due to this complication.

Treatment resolves itself into four stages: resuscitation, temporary arrest of bleeding by the use of the Sengstaken tube, treatment and prevention of hepatic coma and more permanent arrest of bleeding by surgical removal

of the varices or by attempting to reduce the portal hypertension present by some type of shunt operation between portal and systemic circulations.

Resuscitation.—As the degree of liver damage sustained will depend upon the extent and duration of reduction of the hepatic blood flow, urgent replacement of the blood and fluid loss should be undertaken. If blood is not immediately available a saline or dextran drip should be started until cross-matched blood can be obtained. Administration of oxygen may help to combat this period of cellular and cerebral anoxæmia.

The use of the Sengstaken tube.—Experience with the Sengstaken tube in Leeds has shown that on many occasions hæmorrhage has been arrested and the life of the patient saved.

The tube of the œsophageal compression balloon has three lumina: one leading to a round gastric balloon, a second to a long, sausage-shaped œsophageal balloon and the third serving as a gastric tube through which aspiration or feeding can be undertaken.

The balloons of the tube should be carefully checked for leaks before introduction and the capacity of the gastric balloon determined by filling it with water. The deflated tube is then passed through the nostril into the stomach; sucker apparatus should be available at this time lest blood be aspirated. The gastric balloon is then fully distended with water which is coloured purple with a gentian violet solution. The tube is then pulled gently upwards until resistance indicates that the gastric balloon is at the cardia and is preventing the tube from being coughed up, and the tube is fixed under slight tension by strapping to the patient's cheek. The œsophageal balloon is now inflated with air to 30 mm. Hg and this pressure maintained by connecting the tube to a mercury sphygmomanometer. The œsophageal balloon is deflated hourly and gastric aspiration performed, a record being kept as to whether aspirations are blood-stained or clear. A nurse should be in continuous attendance and should be warned that the anchoring gastric balloon may leak, allowing the inflated apparatus to be coughed up into the pharynx and cause asphyxia. She should be equipped with scissors to cut the tubes attached to the balloons if respiratory difficulty arises. Leakage from the gastric balloon can be recognized by the appearance of purple staining of the gastric aspirations. The œsophageal balloon can then be deflated, the apparatus removed and later replaced by an efficient one.

The tube is left in position for twelve hours if the gastric aspirations have become clear, and the œsophageal balloon is deflated and left in the stomach for a further twelve hours. If no further bleeding occurs the stomach balloon is let down and the tube withdrawn. The intermittent pressure applied to the œsophagus reduces the risk of mucosal necrosis which will occur if a prolonged or high pressure is maintained and which constitutes a considerable disadvantage to the apparatus.

Prevention of hepatic coma.—Reductions in hepatic blood flow after bleeding often induce hepatic coma and this must be prevented or treated by emptying the bowel of blood by a saline purge and enema, by giving a protein-free fluid diet of 2 litres of 20 per cent. glucose daily through the gastric tube, by maintaining electrolyte balance and by sterilizing the bowel with neomycin, 6 to 8 g. daily, to reduce protein breakdown. Drugs likely to precipitate coma, such as ammonium chloride and acetazolamide, should be suspended. A record should be kept of the patient's state of consciousness, the presence of tremor and hepatic fœtor, and the plantar responses. After the tube has been withdrawn 10-g. increments of protein should be added to the diet until early symptoms of hepatic coma are induced and the amount of protein taken should then be maintained slightly below this level.

Permanent arrest of bleeding.—This may be attempted by removing the varices either by a transthoracic approach (Linton and Warren, 1953) or by transecting and re-anastomosing the stomach together, in this way dividing the vessels which feed the varices in the lower œsophagus (Tanner, 1954b). Alternatively, after a preliminary splenic venography to confirm that the portal vein is patent, a portacaval anastomosis should be performed in an attempt to reduce the portal hypertension. The use of the œsophageal balloon has reduced the need for this operation to be undertaken as an emergency procedure, although it is still sometimes necessary.

SUMMARY

The causes, investigation and management of gastro-intestinal bleeding have been described.

A plea has been made for the wider use of methods capable of establishing an early diagnosis.

The emergency barium meal has proved the most reliable diagnostic method and the one causing least discomfort to the patient.

The wider use of transfusion, early liberal feeding and emergency surgery has strikingly reduced the mortality from this serious complication in recent years.

The treatment of hæmatemesis from bleeding œsophageal varices is outlined.

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PEPTIC ULCER AND LIFE ASSURANCE

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In the United Kingdom peptic ulcer is one of the commonest chronic diseases, especially in young adult and middle-aged males, who form the vast majority of those who take out life assurance. Doll, Avery Jones and Buckatzsch (1951) found a history of peptic ulcer in just under 10 per cent. of males aged 45. In 100 consecutive applicants for life assurance examined recently, I found such a history in seven. It is therefore a disease which is often discussed by those who are concerned with life assurance underwriting, and is of considerable interest to doctors who undertake life assurance examinations. Doctors may also be asked by their ulcer patients about their prospects of being accepted at standard rates if they apply for a policy.

PAST AND PRESENT

Fifteen years ago, when I first undertook life assurance examinations, I was surprised to find that cases of recurrent dyspepsia, without any demonstrable organic lesion, were sometimes charged an extra premium. Ulcers were treated severely. In 1946, one large company claimed that in the previous ten years they had accepted only eleven proposals with a history of peptic ulcer. Another company automatically declined all cases with symptoms within two years. Even after two years' freedom from symptoms the applicant could expect a heavy surcharge. In 1946, Professor J. A. Nixon concluded his Presidential Address to the Assurance Medical Society on 'Peptic Ulcer in Relation to Life Assurance' by saying:—

> 'My own impression is that their expectation of life is considerably below normal and that we ought to regard them with great caution. It is possible one might issue endowment policies up to the age of 45 but I am not sure that I should recommend that they should be given endowment policies up to age 50'.

Today the prospect for life assurance proposers with a history of peptic ulcer is very different and I shall later give some examples of what may be expected. In some quarters it is doubted whether any peptic ulcer case should ever be charged anything but the standard rate of premium. In support of this it is often stated by those who examine death claims that claims giving peptic ulcer as the cause of death are seldom seen.

SOME STATISTICS

Much has been written on the prognosis of peptic ulcer, but most writers refer only to recurrence rates and not mortality rates, which is what concerns us in life assurance. Owing to the variability of the disease and the many subgroups into which it is divided the prognosis is a particularly complicated matter and it would be unwise for me to enter into statistical

arguments on the rates of premium which should be charged. A few figures, however, are of some general interest and may help to explain the changed outlook of insurance companies; although it should be admitted that this improved outlook is partly because a general increased life expectancy enables underwriters to take a more lenient view of all impaired lives.

Table I compares the mortality from peptic ulcer with other causes and shows that it is only a minor cause of death. Table II compares the death

Cause of death	
Gastric ulcer	74
Duodenal ulcer	84
Arteriosclerotic heart disease (including coronary disease)	2,395
Tuberculosis, all forms	147
Cancer of bronchus and lung	526

TABLE I.—Crude death rate per million for males, 1958.

rate in recent years with that twenty years previously and shows that, although there has been a reduction in deaths from gastric ulcer, the death rate from both types combined has increased, which does not at first sight seem to justify more leniency. When the deaths at various ages are examined,

	1935	1936	1937	1938	1955	1956	1957	1958
Gastric ulcer	84	85	86	84	87	84	77	74
Duodenal ulcer	44	50	48	46	99	92	84	84

TABLE II.—Death rates per million for peptic ulcer (males).

however, it is seen that all the increase is over the age of 60 and that there has in fact been a considerable decrease in deaths below this age since 1938 (fig. 1). Many policies mature when the assured is aged 60 to 65 and this helps to explain why few death claims from peptic ulcer are seen in life assurance offices.

The fact that people seldom die of peptic ulcer does not, of course, necessarily mean that peptic ulcer cases have a normal life expectancy. They may be more prone than the average to succumb to other diseases. For instance, Watkinson (1958) found a significantly increased incidence of coronary sclerosis in males with chronic peptic ulcer in the age-group below 45 years. The impairment study of the Society of Actuaries (of America) in 1951 also found a high rate of death from coronary disease in peptic ulcer cases.

The only figures which are of practical importance to underwriters are the mortality rates for the type of peptic ulcer cases who apply for and are accepted for life assurance. Reliable figures of this sort are very difficult

to determine. Assurance companies are usually reluctant to embark on what at first sight seems a useful line of research. The trouble is that it takes a long time, and is correspondingly expensive, to collect the necessary figures, and by the time they have been collected they are apt to be out of date. The mortality figures in table III are extracted from the Society of Actuaries (of America) Impairment Study of 1951. Too much reliance cannot be attached

	Time since attack (years)	Mortality rate (percentage)
Gastric ulcer, without operation, one attack, not known to have had hæmorrhage	2	163
	3–5	116
	6–10	86
Duodenal ulcer without operation, one attack, not known to have had hæmorrhage	2	125
	3–5	133
	6–10	80

TABLE III.—Mortality among cases of gastric and duodenal ulcer accepted for life assurance in the United States. The figures are taken from the Society of Actuaries (of America) Impairment Study, 1951. Expected mortality = 100 per cent.

to such figures because the cases have been divided into many subgroups and some of the subgroups seem very small. They do, however, tend to show that in groups of cases which have had but one attack of peptic ulcer there is an increased mortality if the attack was within five years of being accepted for assurance. When this study was compared with previous similar studies the following conclusion was reached:—

'There has unquestionably been real improvement in the prognosis for persons with peptic ulcer. A comparison of the actual death rates in the ulcer classification in the present and earlier studies shows that the death rates in the present study have been lower than in earlier studies. The decline in mortality among persons with peptic ulcer has not, however, kept pace with that of unimpaired risks and this is reflected in some increase in the relative mortality found in the present study among persons with peptic ulcer'.

INFLUENCE OF OPERATION

Nearly all the operated cases of peptic ulcer who apply for life assurance regard themselves as cured and admit to no symptoms other than a tendency to distension after meals. Underwriters, on the other hand, are naturally sceptical about this and the occurrence of such symptoms as recurrent ulcer, chronic diarrhœa, anæmia and loss of weight makes them doubt whether gastrectomy cases can ever be accepted as normal people. The 1951 impairment study surprisingly showed a much higher mortality in recently operated cases compared with unoperated cases, but it should be remembered that at that time the operated group contained a large proportion of gastroenterostomies. The present tendency is to accept operated cases at ordinary rates if they are in good health five years after the operation, but to impose special conditions in more recent cases.

INFLUENCE OF COMPLICATIONS

Chronic debilitated cases with *avitaminosis* and *alkalosis* are nowadays a rarity and are not seen in life assurance practice. The complications which most often have to be considered are perforation and hæmorrhage.

About one-third of all deaths from peptic ulcer are due to *perforation*. This, of course, is not much use to the underwriter who does not know in

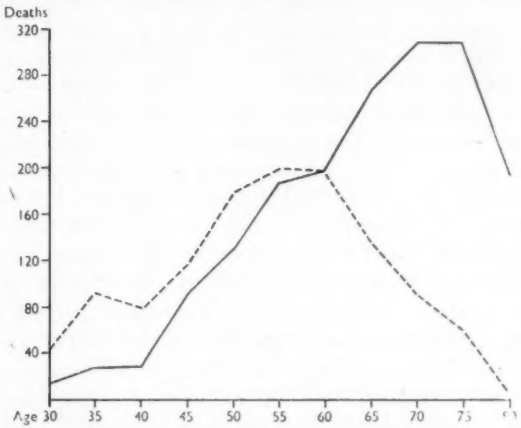

FIG. 1.—Male deaths from duodenal ulcer at different ages in 1938 and 1958. The number of deaths in 1938 (– – – –) was 1,254 and in 1958 (—— ——) was 1,817.

advance which cases will perforate. In fact many of these perforated cases have no previous symptoms. What matters in life assurance is whether the case which has had a perforation and recovered is liable to have another. Second perforations are not very common and it is unlikely that one attack predisposes to further attacks. Further as perforation occurs in both acute and chronic ulcers, a history of a past attack cannot have much prognostic significance.

Hæmorrhage, on the other hand, does tend to recur, except when it is due to an acute erosion. A history of ulcer with hæmorrhage will therefore be regarded more seriously than one without; indeed impairment studies show a greatly increased mortality in the hæmorrhage groups.

THE MEDICAL EXAMINER'S PART

From what has been said it will be gathered that assurance companies are inclined to classify cases into groups. Theoretically this is the easiest way for an actuary to do the underwriting. Having grouped the cases he tries to find the mortality of the groups from past experience and decides on a suitable premium. Applied in the broadest way all he needs to know is whether or not the applicant has had a disease such as peptic ulcer, so that

the examiners need only answer 'yes' or 'no' to the questions. Such a crude method falls down in practice because of a reluctance to apply it to the better cases in the group, because of many borderline cases and because of the difficulties caused by cases having more than one adverse feature; so that it is nowadays more common for the actuary to take the case as an individual and try to decide by how much his expectation of life deviates from the normal. For this difficult task the more information he has the better.

'It is a matter of experience that the more exact and definite the information obtained as to unfavourable features in personal or family history, the more easy it is to secure favourable terms of acceptance'.

This quotation taken from a book on life assurance medicine published in 1895 is just as true today. The examiner who is content with answering questions with a plain 'yes' or 'no' or a brief expression such as 'Duodenal Ulcer 1958' is not only making it difficult for the actuary but may be doing the client a disservice. Nearly all life assurance report forms in this country leave some space for a brief history. In peptic ulcer cases it is desirable to give the date of onset of symptoms, the criteria of diagnosis—e.g. was it by x-ray or by gastroscopy—the complications, a brief indication of the treatment, and how long there has been freedom from symptoms. Because histories are not always well recorded some companies issue a 'gastric questionnaire' in suspected ulcer cases to ensure that the important points are elicited.

It is unusual for life assurance cases to present any physical signs. Activity of the ulcer may be shown by tenderness or rigidity. The state of the teeth and tongue are important. The nutrition and general appearance should be recorded. The presence of 'peptic ulcer facies' usually indicates that the patient has suffered from prolonged dyspepsia at some time.

In his final summing up the examiner should express an opinion on the general character of the client—whether he is likely to be careful with his meals, and his habits with regard to alcohol and smoking.

THE DIAGNOSIS

As the client being examined is naturally on his guard and sometimes frankly uncooperative a diagnosis based on history and signs may be even more difficult than usual. The fallacies of radiography, unless done by the most expert, are well known, but as some criterion of diagnosis is necessary it is usual in life assurance work to lay a lot of stress on it. That an x-ray has been taken indicates that the dyspepsia has been more than trivial. Usually the result is accepted as conclusive unless the other evidence is very strong.

It would sometimes be an advantage to have a barium meal as part of the life assurance examination, but the expense is not likely to be welcomed by the company except when large sums are involved. Sometimes the client may be offered an opportunity of providing x-ray evidence at his own expense to dismiss a suspicion.

A test for occult blood in the stools would be a simple and inexpensive way of testing for the activity of an ulcer but, because of the necessity for a special diet and peoples' distaste for collecting stool specimens, it is seldom used in life assurance work.

THE RECENT CASE

When symptoms have developed recently it is difficult to know whether they are caused by a simple dyspepsia—perhaps due to worry over some business which has led to taking out life assurance—or are the beginnings of some serious disease, possibly cancer. Recent hæmorrhage is especially difficult to assess. It is in such cases that an up-to-date x-ray would be useful. It will often be necessary to postpone the case or to impose a special rate of premium or a lien for a period.

CONCLUSION

Peptic ulcer is not nowadays considered a serious adverse feature in life assurance. Cases with symptoms may be postponed, especially if the symptoms are of recent origin, but it is quite likely they will obtain a policy on special terms. Applicants who have had one short attack in the past may be accepted on ordinary terms some three to five years after the attack. With recurrent attacks a longer period of freedom will be required before ordinary rates are offered. Those who have had a successful operation may be accepted on ordinary terms five years (sometimes less) after the operation. A history of hæmorrhage will cause the case to be regarded more seriously, except when due to acute erosions.

The opinions expressed in this paper are my own and do not necessarily correspond with those of any individual company.

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BLOOD GROUPS AND PEPTIC ULCER

By R. B. McCONNELL, M.D., M.R.C.P.

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We are now beginning to understand why one man develops a duodenal ulcer and another does not, even though they are both apparently under the same degree of environmental stress. Until recent years tissue resistance was an unaccountable factor in ulcer research; we did not even know whether the remarkable family aggregations of the disease were due to the members of a family having a common environment or to hereditary factors.

THE INHERITANCE OF PEPTIC ULCER

Doll and Kellock (1951) demonstrated that heredity is concerned, and, not unexpectedly, duodenal and gastric ulcers were found to be inherited independently. From the genetic point of view therefore the two types of ulcer must be considered separately. Even though some families have such a large number of duodenal ulcers that one might suppose a single dominant gene is at work, the over-all distribution in the population makes it certain that this is not so. Much more likely is it that the inheritance of liability to develop ulcer is polygenic: i.e. due to genes at several different sites (loci) on different chromosomes. Considering that we can only test for the presence or absence of very few of Man's genes, it is surprising that we now know two of the genetic loci concerned in duodenal ulcer; they are the locus for the ABO genes (which determine the ABO blood group of the individual) and the locus for the secretor genes, which are discussed on p. 351. In gastric ulcer the position is less certain, perhaps because it may not be one disease; it is likely, however, that the ABO and secretor genes are concerned also in at least some types of gastric ulcer. A third set of genes, that controlling the Lewis antigens, may be involved in duodenal ulcer, but it is unlikely to be of great importance in Britain where only about 3.5 per cent. of the population lack these antigens.

For fifty years after their discovery in 1900, no-one knew why human populations contained people of the different blood groups. Apart from some minor effects on hæmolytic disease of the newborn, and their nuisance value in blood transfusions, it did not seem to matter whether one inherited A, B or O genes from one's parents. By 1945 the geneticists, R. A. Fisher and E. B. Ford, had worked out theoretically that the blood groups were very unlikely to be neutral from the point of view of natural selection and had predicted that they would be found to be concerned in disease, but no-one suspected that they might be concerned in gastro-intestinal disorders. In retrospect this seems surprising as it had been shown in 1933 that, in addition to being on the red cells, the blood-group antigens were also

present in high concentration in the saliva and gastric juice of 75 per cent. of the population. Such a state of affairs is very unlikely to be fortuitous, particularly as the presence or absence of the antigens in saliva is genetically determined. People with the ABO antigens in saliva are called secretors, and those without them non-secretors (these antigens are present in even higher concentrations in the seminal fluid of secretors, another finding unlikely to be fortuitous but for a reason still unknown).

DUODENAL ULCER

Even though an association between the ABO blood groups and duodenal ulcer had been looked for and found before the 1939-45 War, it was not until 1954 that the application of improved statistical techniques and the use of adequate control series made it possible for this to be demonstrated convincingly (Aird *et al.*, 1954).

The finding was that people of blood group O were about 35 per cent. more liable to develop duodenal ulcer than were people of groups A, B, or AB. This finding, which applied to Great Britain, has been confirmed by many others in this country and also in all other parts of Europe including Italy and Poland. It has also been confirmed in white and negro Americans, and in Japanese, Chinese and Bantu. As the relationship has been found in populations of so many different ethnic origins, it is impossible for it to be due to a particular racial stratum with a chance association of a high group O frequency and high duodenal ulcer liability. The universal finding of the disadvantage conferred by the O blood group might also be interpreted as indicating that the same environmental factors are responsible in different parts of the world.

The demonstration that the secretor genes are also concerned followed soon afterwards (Clarke *et al.*, 1956). Non-secretors were found to be about 50 per cent. more liable than secretors, and this has been confirmed by other workers in this country and in the United States.

BLOOD-GROUP AND SECRETOR STATUS

The two characters, blood-group and secretor status, are inherited independently, and therefore a population can be divided into eight different types of individual, depending upon the four blood groups and two secretor types. In tables I and II, people of blood groups A, B, and AB have been combined as there is no apparent difference between them as regards susceptibility, thus reducing to four the different types of individual. When the frequency of these types in a duodenal ulcer series is compared with the frequencies in the general population, we find that people who are both group O and non-secretor are the most liable to the disease, and that secretors of groups A, B, and AB are the least susceptible. Table I shows the percentages of the different types and also the percentage increase or decrease in the ulcer series compared with the controls. In table II, the least suscep-

tible type, the secretors of groups A, B, and AB, have been taken as a baseline and the liability of the other types calculated from them. It can be seen that group O non-secretors, who make up 10 per cent. of the population, are 2½ times more liable than the 40 per cent. who are secretors of groups A, B, and AB.

How many other genetic loci are concerned in the basis of duodenal ulcer is uncertain. Some idea of the size of the blood-group contribution can be given by these data, which mean that there would be about 25 per cent.

Blood-group and secretor type	Percentage in 861 controls	1000 duodenal ulcers		251 gastric ulcers	
		Percentage	Percentage increase or decrease on controls	Percentage	Percentage increase or decrease on controls
Group O non-secretor	10.9	19.8	+ 81.6	16.3	+ 49.5
Groups A, B, and AB non-secretor	13.1	14.1	+ 7.6	13.9	+ 6.1
Group O secretor	36.7	37.0	+ 0.8	35.1	— 4.4
Groups A, B, and AB secretor	39.3	29.1	— 25.9	34.7	— 11.7
	100.0	100.0		100.0	

TABLE I.—Percentages of different blood-group and secretor types in a general population control, and in a duodenal ulcer and a gastric ulcer, series, with the percentage increase or decrease on the control.

Blood-group and secretor type	'Risk' of duodenal ulcer	'Risk' of gastric ulcer
Group O non-secretor	2.45	1.69
Groups A, B, and AB non-secretor	1.45	1.20
Group O secretor	1.36	1.08
Groups A, B, and AB secretor	1	1

TABLE II.—The liability of different blood-group and secretor types to duodenal and gastric ulcer, using the risk of the least susceptible type (the secretor of groups A, B, and AB) as unity.

fewer ulcers than there are at present if the population did not contain any O or non-secretor genes but was made up entirely of secretors of groups A, B, and AB. This does not imply that 25 per cent. of all ulcers are caused by these genes without the aid of the environment. Environmental factors must be of supreme importance in the over-all incidence in the population, and be responsible for the remarkable increase in the past hundred years, as the genes in the population cannot have changed appreciably during that time. If two populations are under similar environmental stress, however, that with the higher proportion of group O people should have a higher incidence of duodenal ulcer. The data from Great Britain suggest that this may indeed be so: the farther north one goes the higher the proportion of group O people and probably also the higher the incidence of duodenal ulcer.

GASTRIC ULCER

The incidence of the ABO blood groups has been studied in gastric ulcer series in various parts of the world. The results suggest that group O people are about 20 per cent. more liable than those of groups A, B, and AB (Roberts, 1959). Efforts have been made to find out if this increased liability applies to ulceration in any particular part of the stomach, but the results have been conflicting (Doll *et al.*, 1960). Only two small series of gastric ulcer patients have been studied for secretor status; both show an increased incidence of non-secretion compared with controls, indicating that non-secretors are about 25 per cent. more liable than secretors. Thus group O and non-secretion seem to increase liability to gastric ulcer, but to only about half the extent that they do in the case of duodenal ulcer.

The figures in tables I and II are taken from the results of a gastric ulcer series we have tested in Liverpool. We find that the liability of the different types of individual is in the same sequence as we found with duodenal ulcer. Once again the most susceptible are the group O non-secretors, but their increased risk over the least susceptible is only 70 per cent., i.e. not quite half their increased risk of duodenal ulcer.

THE BASIS OF THE RELATIONSHIPS

We still do not know the mechanism by which these blood-group genes influence susceptibility to duodenal and gastric ulcer. The fact that they are also concerned in carcinoma of the stomach and pernicious anæmia suggests that they play a part in the physiology of the upper gastro-intestinal tract as well as in its pathology. Our knowledge of gastric physiology, apart from the mechanisms controlling acid production, is still too scanty for any definite conclusions to be drawn regarding the function of the high concentrations of blood-group antigens in gastric juice.

THREE POSSIBILITIES

There are, however, several possibilities:—

(1) The blood-group antigens are mucoid substances and we might expect them to be part of the barrier protecting the mucosa from physical and chemical assault. This may indeed be part of their function, but it is not the mechanism by which people of different blood groups have differing susceptibilities to duodenal ulcer; this is shown by the fact that group O non-secretors are significantly more liable to duodenal ulcer than are non-secretors of groups A and B, even though the gastric juices of non-secretors of all blood groups are serologically identical (Clarke *et al.*, 1959). In addition, we found that secretors who had developed an ulcer had no less titre of the antigens in their saliva than their unaffected brothers and sisters or population controls; there is a good correlation between the titre in saliva and that in gastric juice.

(2) It may be that the ABO and secretor genes are concerned in some

biochemical process quite unconnected with that of determining the specificity of the antigens. For instance, they may play a part in deciding the type of gastric mucosa, that of people with O or non-secretor genes being able to respond to stimuli by producing more acid than can that of people with A or secretor genes. This possibility is being tested, and so far the results are inconclusive. It is interesting, however, that it has been found (Doll *et al.*, 1960) that the incidence of group O is even higher in stomal ulcer than it is in duodenal ulcer, and there is probably a more direct relationship between stomal ulcer and acid than between duodenal ulcer and acid.

(3) All the blood-group antigens are likely to have the same physical properties, and it is only in their serological reactions that they differ markedly one from another. Liabilities and protections conferred by them are therefore most likely to be based on immunological processes.

CONCLUSION

It is now firmly established that the ABO and secretor genes are concerned in the etiology of duodenal ulcer and probably also of some gastric ulcers. A clue to the mode of action might be found if more were known of the environmental conditions causing duodenal ulcer. Conversely, discovering the mode of action of the antigens should reveal the important environmental factors.

So far, ulcer research has been concerned with either environmental factors, acidity, gastric mucus or genes. It would seem that the time has come when all these facets of the problem should be studied at the same time. The result could well be our understanding of the real cause of the disease.

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FOOT INJURIES IN THE AERO-ENGINE INDUSTRY

A PLEA FOR THE GREATER USE OF SAFETY FOOTWEAR

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Foot injuries which occur in industry result from a variety of causes, but perhaps the most important factor in their causation is the unsuitability of the type of footwear worn by the employees in the type of surroundings in which they work.

		ANKLES		
		1957	1958	1957 and 1958
Twists, sprains	R	14 (3)	15 (3)	29 (6)
	L	9 — 23 (3)	16 (1) — 31 (4)	25 (1) — 54 (7)
Sport	R	6 (1)	2	8 (1)
	L	2 — 8 (1)	6 (1) — 8 (1)	8 (1) — 16 (2)
Sepsis, burns, punctured wounds	R	0	2	2
	L	0	3 — 5	3 — 5
Dropping objects	R	2	1	3
	L	2 — 4	0 — 1	2 — 5
Miscellaneous other conditions	R	19 (1)	22 (1)	41 (2)
	L	21 (1) — 40 (2)	11 (2) — 33 (3)	32 (3) — 73 (5)
	B	0	0	0
		FEET		
		1957	1958	1957 and 1958
Twists, sprains	R	8 (1)	3	11 (1)
	L	3 — 11 (1)	1 — 4	4 — 15 (1)
Sport	R	6	2 (1)	8 (1)
	L	2 (2) — 8 (2)	2 — 4 (1)	4 (2) — 12 (3)
Sepsis, burns, punctured wounds	R	14	7 (1)	21 (1)
	L	10 — 24	7 — 14 (1)	17 — 38 (1)
Dropping objects	R	36 (14)	44 (17)	80 (31)
	L	39 (10) — 75 (24)	43 (16) — 87 (33)	82 (26) — 162 (57)
Miscellaneous other conditions	R	32 (5)	26 (2)	58 (7)
	L	20 (4) — 52 (9)	18 (1) — 44 (3)	38 (5) — 96 (12)
	B	2	1 + 1*	3 + 1*

( ) No. of fractures. * Dropping objects involving both feet. R = Right foot. L = Left foot. B = Both feet.

Table I.—Analysis of foot injuries.

SCOPE OF INVESTIGATION

This analysis of foot conditions was first of all prompted by a request to see a female employee who was wearing most unsatisfactory footwear, in fact a pair of rubber plimsoles; and also by noticing that quite a large number of employees sustaining fractures of the feet had had some heavy object drop on their feet.

The period covered is 1957 and 1958, and includes all the foot conditions sustained by employees, with the exception of verrucas which constitute only a minute fraction of the conditions seen. All figures have been compiled from the records kept in the chief medical centre of all cases which have been seen by a doctor in the centre. The figures exclude a small proportion of employees, who were either sent direct to the hospital casualty department by a member of the nursing staff, e.g. in the doctor's absence, or who went of their own accord, or via their own private doctor to the hospital casualty department without first reporting to the medical centre.

FIG. 1.—An example of the type of accident that often occurs. A heavy object, in this case a heavy metal plate, falls on the shoe.

INCIDENCE

From table I, it can be seen that the highest single cause of foot injuries is the dropping of various types of object, particularly on the toes (fig. 1, table II). In 1957, this cause accounted for 30.6 per cent. of foot conditions, and in

	1957	1958	1957 and 1958
R. great toe L. great toe	20 (10) 18 (6) } 38 (16)	26 (12) 27 (11) } 53 (23)	46 (22) 45 (17) } 91 (39)
R. second toe L. second toe	6 (3) 4 } 10 (3)	5 (3) 5 (1) } 10 (4)	11 (6) 9 (1) } 20 (7)
Other toes	10 (5)	12 (6)	22 (11)

( ) No. of fractures.

TABLE II.—Toe injuries from dropping objects.

1958, this percentage had risen to 37.3 per cent. The objects which are dropped cover a wide selection: e.g. grinding wheels, castings, boxes, steel plates, drawings, steel and iron blocks, dies, glass plates, and spanners, but probably one of the most common articles dropped is the casting. As most of these are of considerable weight, one must expect some damage to the feet if unsuitable footwear is being worn. In 1957, 24 fractures of the toes resulted from 75 injuries to the feet from dropping objects; i.e. 32 per cent.; and in 1958, 33 fractures resulted from 87 injuries, i.e. 37.9 per cent. From

these figures, it can be seen that just over one-third of all injuries from the dropping of objects result in fractures. Such injuries could be classified as 'mitigable injuries': i.e. injuries which could have been avoided altogether or at least greatly reduced in severity if protective or safety footwear had

		1957	1958	1957 and 1958
Conditions	Ankles	75	78	153
	Feet and toes	172	155	327
	Total	247	233	480
Fractures	Ankles	6	8	14
	Feet and toes	36	38	74
	Total	42	46	88
Fractured toes from dropping objects		24	33	57

TABLE III.—Total foot injuries and fractures.

			'Mitigable injuries'	
	1957	1958	1957	1958
Right	32 (4)	26 (2)	9 (3)	8 (2)
Left	20 (4)	18 (1)	10 (1)	5
Both	2	2	0	0
Total	54 (8)	46 (3)	19 (4)	13 (2)

( ) No. of fractures.

TABLE IV.—Miscellaneous other conditions (feet).

been worn. A further small percentage of injuries extracted from the section on miscellaneous other conditions, which could be added to this group of 'mitigable injuries' will be mentioned later.

In these two years, 1957 and 1958, fractures of the toes accounted for 54.5 per cent. and 71.7 per cent., respectively, of all fractures sustained.

If we compare each of the condition groups in table I as a percentage of the total conditions, it can easily be appreciated how significant are the injuries due to the dropping of objects (fig. 2, table III).

On the left-hand side of table IV, the figures, with their resultant fractures in the brackets, represent the total number of conditions listed as 'miscellaneous other conditions' of the feet in table I. They are the result of such accidents as 'foot caught under truck wheel'. A number of these injuries could have been avoided, or at least greatly minimized, by the use of protective or safety footwear. These injuries are grouped together on the right-hand side of table IV under the heading 'mitigable injuries'. Such injuries formed 35.2 per cent. and 28.3 per cent., respectively, of this miscellaneous group in 1957 and 1958. The equivalent fracture figures were 50 per cent. and 66.7 per cent., respectively. When these 'mitigable injuries and fractures' are compared with the total number of feet conditions in these two years, we obtain percentages of 7.7 and 5.6, respectively, for the injuries and 9.5 and 4.4, respectively, for the fractures.

Total 'mitigable injuries' of the feet.—When the 'mitigable injuries' from dropping objects on the feet (see fig. 2) and those from the group 'miscellaneous other conditions (feet)' are added together, the total 'mitigable injuries' become 38.3 per cent. and 42.9 per cent., respectively, for 1957 and 1958, and the 'mitigable fractures' 66.6 per cent. and 76.1 per cent., respectively. On the average, over the past two years, two-fifths of the injuries and almost three-quarters of the fractures could probably have been eliminated if the proper type of footwear had been worn. In terms of individual employees, it would have meant that 97 employees need not have attended at the medical centre each year.

PRODUCTION TIME LOST

The calculations are worked out from figures extracted from the Safety Report and cover 1958 only; no figures for 1957 are available. The figures cover 20 employees who lost time from work; 11 of those were seen in the medical centre, the other nine were first seen at the hospital casualty department. Twenty represents only a small number of employees, but the time lost in terms of production is high.

(A) *The eleven employees seen in the medical centre:*—

(1) 6 employees lost 133 working hours (average 22.17 hours each).

(2) 2 employees lost 158 working hours (average 79 hours each). These two employees were still absent at the beginning of 1959.

(3) 3 employees lost 546 working hours (average 182 hours each).

The injuries in (1) and (2) were all of the 'mitigable type'.

(B) *The nine employees seen at the hospital casualty department:*—

(1) 7 employees lost 500 working hours (average 71.42 hours each).

(2) 1 employee lost 88 working hours (still absent at beginning of 1959).

(3) 1 employee involved in accident on 31.12.58 (absent at beginning of 1959).

All these except one were of 'mitigable type' (this exception lost 114 hours).

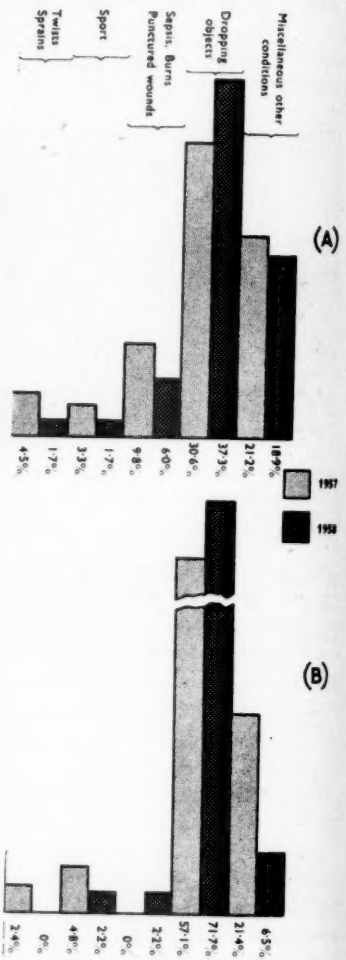

FIG. 2.—Diagrammatic representation of the foot conditions listed in table I, showing the high percentage of injuries due to the dropping of objects. (A) = 'condition' group. (B) = fractures.

If the lost working hours are considered as a whole, 1,425 hours were lost by the end of 1958; this figure, of course, is short of the full total as there were still four employees away from work at the beginning of this year. This includes one employee who sustained his injury on December 31, 1958, and is therefore excluded from the calculations. 1,425 working hours lost by 19 employees = 178 working days or 35.6 working weeks lost to production. This gives an average of 75 working hours (almost two weeks) absence from work for each individual concerned. It was interesting to note that one employee from an outlying unit of this industry, and therefore one not seen at the medical centre, had a total of 563 working hours lost. This is equivalent to 14 weeks in a 5-day working week from an injury which could be classified as mitigable.

When only the 'mitigable injuries' from this group of time lost accidents are considered, it is found that 665 working hours were lost by 15 employees. This is equivalent to 83.1 working days (or 16.6 weeks) or a loss by each individual of 44.3 hours (or 5.5 days): a loss by each employee as a result of a mitigable injury of just over one week. In the terms of industry, this loss of 665 working hours means a loss which is much greater to production —a loss that could have been avoided by the use of suitable footwear.

So far, mention has been made only of loss of production due to employees actually being absent from work. In 1958, there were twenty such reportable cases, i.e. absence from work for more than three days, but from the point of view of the other employees, and this means well over two hundred a year who injure themselves, but remain at work, there is also loss of production. At the time of an accident, the production flow is disrupted with consequent loss in production, not only by the employee who is injured, but also by other employees who assist the injured person. Production is still disrupted during the time the injured employee is taken to the surgery and treated, and in fact until the employee returns to his own job. The actual time spent in the surgery depends, of course, upon the nature of the injury. Sometimes it means some readjusting of employment, should it be found that the injured person is not capable as a result of the injury to continue with the same job. Until the injury is fully healed, it means still further interruption in production every time a visit is made to the surgery for re-dressings and the like.

It would be extremely difficult to estimate the actual loss to production and therefore the resulting cost to industry, but the figure must be quite high. This is a direct cost due to loss of production. In addition, other costs are also involved: e.g. settlements at Common Law and industrial injuries payable by the State. As a result of an injury an employee with his family may experience hardships, which in many cases could be avoided if the precautions were followed.

TREATMENT

Most of the mitigable types of injury involve the toes and often result in a fracture. All such injuries have radiographs taken in the medical centre.

Over the years 1957 and 1958, the types of fracture most commonly seen were those involving the tip of the terminal phalanx, oblique fractures usually of the middle phalanx and comminuted fractures of the terminal phalanx. Most of the fractures were in good position and showed very little displacement. There was an occasional flake fracture and one involving a joint surface. If the injury results in a fracture with no break in the continuity

FIG. 3.—The extent of damage to the shoe that can result from the type of accident shown in fig. 1. This is a safety shoe and no injury occurred to the toes.

FIG. 4.—An example of the new light-weight protective shoe.

of the skin, a collodion splint is applied, particularly when it is the great toe that is involved. Generally for other toes, a pad of orthopædic felt is placed under the metatarsals and this usually suffices. The fractures are reviewed in one week from the time of injury and generally the collodion splint can be discarded and a pad of orthopædic felt substituted. This pad is left *in situ* until the patient feels he can manage without it—generally after two to three weeks.

When the continuity of the skin is broken, paraffin gauze dressing B.P.C. is applied, again with the use of orthopædic felt under the metatarsals. On occasions, a nail has to be removed, or a nail has to be punctured to relieve a subungual hæmatoma.

SAFETY OR PROTECTIVE FOOTWEAR

Safety footwear has long been encouraged in this industry (fig. 3, 4), many employees obtain supplies, but the numbers are far short of what they should be. This can easily be seen from the numbers of injuries which still occur. Such footwear can be purchased relatively easily, at very reasonable cost which can, in the case of the works personnel, be spread over a number of weeks. The footwear, which includes a few different patterns, is of good quality and carries a high guarantee by the manufacturers in so far as the toes are concerned. The manufacturers offer substantial compensation should injury occur in the part of the foot protected by the toe-caps, provided the injury has been caused accidentally.

From the number of injuries which have occurred so far this year, it is rather disturbing to find that only one employee, since injuring his foot, has purchased protective footwear, and in his case, a pair of shoes. It appears that having a fractured toe does not act as a deterrent, and instead of our policy of 'prevention is better than cure', the employees take the attitude that it has happened once, it will not happen again—which, of course, is not the case.

A greater drive in the sale of protective footwear is being encouraged, and in fact has already started. This is concentrated on a lighter type of footwear (fig. 4), as good in quality as the heavier variety and supplied by the same manufacturers as the heavier variety. It is hoped that employees who, in the past have complained that toe protectors were heavy, will take advantage of this lighter form. It must be emphasized to the employees that whatever trade they pursue, if the hazard of foot injury is present, then the only way to prevent or minimize foot injuries as much as possible is to wear protective footwear.

SUMMARY

Foot injuries which occur in industry, and in this particular case the aero-engine industry, have been discussed.

Throughout special reference has been made to foot injuries caused by the dropping of objects, as these cause a relatively high number of injuries to the employees—employees who might not have required medical attention if they had been wearing the proper type of footwear.

Following this two years' survey of such injuries, it is surprising to find that the response to protective footwear following injuries is extremely poor.

I gratefully acknowledge the assistance given by Mr. A. E. Fairmann and the staff of the Safety Department, the printing facilities provided by Mr. P. I. J. Brabrook, and constructive criticism from Dr. J. Murdoch.

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A DIABETIC RECORD CHART

By M. S. PATHY, M.R.C.P., M.R.C.P.Ed.

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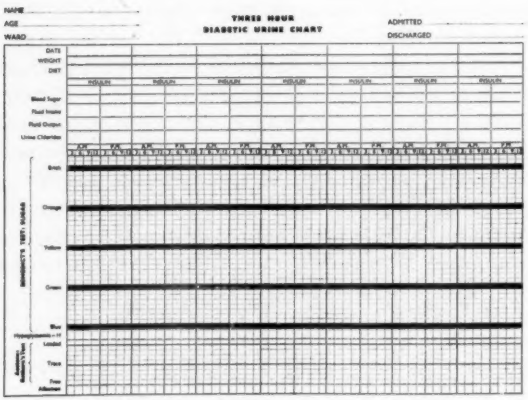
A 'Three Hour Diabetic Urine Chart', measuring 8½ x 10½ inches (21.5 x 26.5 cm.), has been designed to enable most of the necessary information to be entered on one chart. The centre of the chart contains five coloured lines, namely, blue, green, yellow, orange and brick. The results of the tests for glycosuria are entered on the appropriate coloured line. The hours—3, 6, 9, 12—have been chosen to take into account the average time of meals in hospital.

Sections are provided for recording the weight, diet, insulin dose and



blood-sugar estimations. In diabetic ketosis a record of the fluid intake and output, and of the urinary chlorides is of vital importance, and these details can be entered in the appropriate columns. Any hypoglycæmic reactions can be mentioned in the section labelled hypoglycæmia. The lower part of the chart is for recording ketonuria. For simplicity it has been given the title 'Acetone: Rothera's test', but it can be used for noting the results of Gerhardt's test or the tablet test for ketones. The presence of albumin in the urine is recorded in the small squares at the foot of the chart.

This chart has been in use for over seven years and has proved to be of considerable value. A comprehensive picture of the patient's progress may be obtained by little more than a glance at the chart and details of routine urine tests can be recorded rapidly and accurately.

A QUAKER PHYSICIAN

JOHN FOTHERGILL, M.D. (1712-1780)

By BRIAN HILL

Of the subject of this essay Benjamin Franklin is reported to have said: 'I can hardly conceive that a better man has ever existed'. On the other hand, the twenty-one-year-old Fanny Burney confided to her diary: 'I doubt not his being a man of great skill; but his manners are stiff, set and unpleasant'. Which goes to show how differently the same man can impress his personality and character on his fellow-men. In the event, however, the author of 'Evelina' lived to modify her first unfavourable opinion of Dr. Fothergill and in the long run she and Franklin held much the same view of him.

EARLY DAYS

John Fothergill was born at Carr End, Wensleydale, Yorkshire, in 1712. He was the second son of a retired Knaresborough brewer. The Fothergills were Quakers and they brought up their family in that religious persuasion in spite of the difficulties and disadvantages of dissent in the eighteenth century. After his studies at Sedbergh grammar school were completed, the boy, then rising sixteen, was apprenticed to a Bradford apothecary. Next, he was entered at Edinburgh University where it is said that his abilities attracted the attention of the eminent professor of anatomy, Alexander Monro. Later, Monro was to call on this outstanding student to give him some assistance in the revision of his work on osteology.

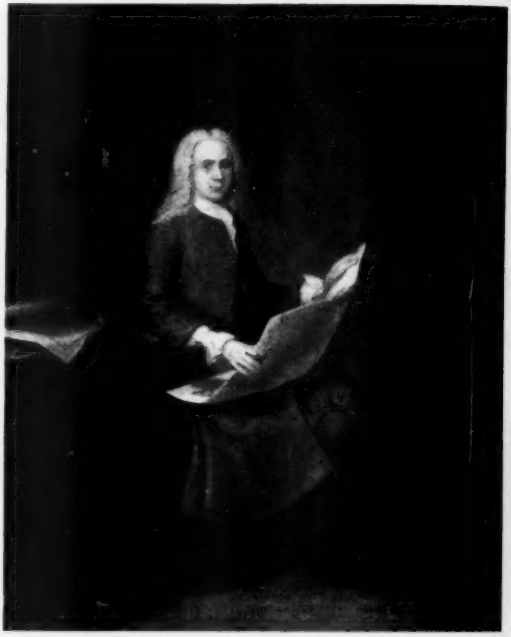
Fothergill took his degree at Edinburgh in 1736 with a treatise entitled 'De emeticorum usu'. To broaden his medical knowledge he moved on to London and studied for a couple of years or so at St. Thomas's Hospital. Then, after a short tour of the Continent, he set up his plate in 1740 in the city of London.

A LUCRATIVE PRACTICE

His practice first lay at White Hart Court, Gracechurch Street. Whatever Miss Burney may have thought, his bedside manner and medical skill must have satisfied his patients, for he soon built up a lucrative practice. In this he was helped by the publication in 1748 of an article on the 'Ulcerous sore throat', which considerably advanced his reputation. His list of patients was swelled by a number of people living in the smarter west end districts, such as Mayfair, and his visiting round became almost embarrassingly prolonged. Accordingly, in 1767 he moved to 16 Harpur Street, close to Theobalds Road, a new and fashionable quarter which was convenient to both ends of the Metropolis.

In 1744, he was admitted a licentiate of the College of Physicians (actually he was the first graduate of Edinburgh thus admitted). He became a fellow

of the College in Edinburgh in 1754 and was awarded the fellowship of the Royal Society in 1763. Being a dissenter, and consequently unable to graduate at Oxford or Cambridge, he was precluded from becoming a fellow of the College of Physicians in London. He had therefore a very real interest in the disputes between the licentiates and fellows of the College which came to a head in 1767. These arose out of the fact that a growing number of distinguished men holding responsible hospital posts in London were ineligible for the fellowship. At first, peaceful representations were made in the endeavour to change the regulations; finally, however, a number of licentiates forcibly broke their way into the College and invaded a meeting of one of its committees. Fothergill took no part in this unlawful assembly, but he subscribed a sum of £500 towards the costs of the legal actions which followed it. He could afford to be generous, for during the best years of his practice he was estimated to be earning £7000 or £8000 a year.



John Fothergill (1712-1780). (*Reproduced by kind permission of the Royal College of Physicians.*)

His manner, if again we are to believe Fanny Burney, reflected his sense of his position:—

> 'His conversation consists of sentences spoken with the utmost solemnity, conciseness and importance. He is an abrupt, stern, proud-looking old man. He enters the room and makes his address with his hat always on, and lest that mark of his sect should pass unnoticed, the hat which he wears is of the most enormous size I ever beheld. Nevertheless', she adds, with a final note of exasperation, 'the old prig affects something bordering upon gallantry'.

Later, she began to appreciate the kindness and wisdom that lay beneath the doctor's unprepossessing exterior and they became good friends. Another passage in her diary reads:—

> 'And really without his stiffness and solemnity, he appears to be as humane as he is skilful'.

Nor was Fothergill without a sly sense of humour, for he told her that he always knew when his patients had turned the corner: if they were men, the bed was strewn with newspapers; if women, his visit would find his patient in new top-knots or he would hear her exclaim: 'Dear me! what a figure I am!'. He advised Fanny Burney never to marry a medical man. 'If he has but little to do', he said, 'he may be distressed; if he has much, it is a very uncomfortable life for his companion'. He himself solved the problem by remaining a bachelor.

COLLECTING AND PHILANTHROPY

This freedom from family life and its cares, coupled with the fact that he took no medical posts outside his practice, left Fothergill money and leisure enough to engage in the scientific and philanthropic activities closest to his heart. He was a keen botanist and purchased an estate at Upton, near Stratford in Essex, which he maintained as a botanical garden. Rare plants came to his hot-houses and nursery beds from all over the world, and his collection was said to be rivalled only by the royal gardens at Kew. On occasion, indeed, his collection outdid that of King George III as a note in 1769 from Queen Charlotte's lady-in-waiting to Fothergill's friend, William Hunter, testifies:—

'Mrs. Schwellenberg's compliments to Dr. Hunter and she heard yesterday that Doctor Fothergyll has got several Tea Trees Come from the Indies in the Last Ship, and the Queen wishes that Dr. Hunter could make interest with Dr. Fothergyll to get Her only one of them for Her Majesty's Own Garden'.

Fothergill also made extensive and valuable collections of shells and insects.

His philanthropy stemmed from his religion. He founded and endowed a Quaker school at Ackworth in Yorkshire, and financed a new translation of the Bible by a young fellow-worshipper. He was generous, too, in many other directions, sometimes to colleagues who had fallen on evil times. Indeed, the only jarring note in his life seems to have been his quarrel with another practitioner, Dr. Leeds, who was also a Quaker. The origin of the dispute is obscure, but it appears that the two men agreed to submit their difference to arbitration and in consequence Fothergill found himself mulcted in damages. He refused to accept this adverse decision and appealed both to the Court of King's Bench and to the Society of Friends. After considering his case, both gave verdicts in his favour—which must have galled Dr. Leeds.

In 1766, there knocked at Fothergill's door a young Quaker who was also to make a considerable name in the medical world. This was John Lettsom, who had been placed by his parents under the guardianship of Fothergill's brother, Samuel, a noted Quaker preacher of his day. Lettsom became not only the pupil, but the devoted intimate of the Doctor:—

'He was more like a parent than a friend. I had access to him at all times, and usually breakfasted with him once a week as long as he lived'.

As a respite from his labours, Fothergill used to retire for two months every summer to Lea Hall, an estate he had bought in Cheshire, conveniently near to Warrington where his brothers had their homes. There, to avoid

being pestered by patients, he refused to accept fees, but even so could not free himself entirely from his practice. One day in each week of his stay he would drive over to Middlewich and there at the inn see all who wished to consult him—without charging a fee.

Fothergill died at his house in Harpur Street, at the age of sixty-eight, from an obstruction of the bladder. One account suggests that this was 'occasioned by a delicacy which made him unwilling to alight from his carriage for relief'; more probably it was due to an enlargement of the prostate. His first attack came early in the winter of 1780, necessitating the use of a catheter. The Doctor recovered sufficiently from this illness to resume his practice. On December 12, 1780, however, a second retention occurred and it was found that the prostate growth had increased. Remedial measures were unsuccessful. He lingered miserably for some days before dying on December 26. He was buried in the Friends' cemetery at Winchmore Hill.

A VALUABLE ESTATE

Fothergill was, it is said, 'of a delicate rather than an attenuated make. His features were all expressive and his eye had a peculiar brilliancy', and the writer goes on to dilate on the charm and discretion which attracted so many patients to him. His features were made known to his contemporaries and to later generations by a portrait by Hogarth and by a bust and medallion by Flaxman. He was of sufficient note, too, to be caricatured as Dr. Melchisedech Broadbrim in Samuel Foote's farce, 'The Devil upon Two Sticks'.

He left an estate of some £80,000, his botanical gardens and house at Upton being valued at no less than £10,000. The gardens have long since been absorbed into West Ham Park and children play where the Doctor's rarities flourished. Lettsom bought many of the plants for his own gardens at Camberwell, whilst the collection of shells and fossils were, by a clause in the will, offered to Dr. Hunter at less than their valuation figure; they found their way into the Hunterian Museum at Glasgow.

Fothergill published a number of scientific articles and these were collected and edited after his death by Lettsom. They appeared in three volumes in 1783 and 1784. Among them were treatises on tic douloureux, 'The sick headache' and 'The Epidemic Disease of 1775' (influenza). The effects of weather on diseases was another subject which interested him.

Lettsom also established a gold medal in his patron's memory which was to be awarded annually for the best essay on a subject of medicine or natural history proposed by the Medical Society (a body which Fothergill had founded in 1752). Only seven of these Fothergillian Medals were struck, six being awarded as prizes—one to Lettsom himself and one to the great Jenner; the seventh for some reason was presented to King George III and, with its portrait of Fothergill, can be seen in the British Museum. A Fothergillian Medal continued, however, for in 1824 the original one was superseded by another one in the name of Anthony Fothergill, a distant relative of John, who had carried on his medical tradition.

GENERAL PRACTITIONERS' FORUM

TRIAL OF AN ANTI-TUSSIVE PREPARATION IN DROPLET FORM

By DAVID C. SAUNDERS, M.B., B.Ch., D.C.H.
Rhondda, Glamorganshire

THE following is an account of my clinical experience with an anti-tussive preparation in droplet form known as 'detigon' (1-*o*-chlorophenyl-3-dimethylamino-1-phenylpropan-1-ol- hydrochloride).

SCOPE OF INVESTIGATION

The trial was carried out in an industrial general practice with a high incidence of chronic chest illness, such as pneumoconiosis, chronic bronchitis and emphysema. The drug was used in 12 children with age ranges from one month to 8 years of age, and also in 30 adults.

Diagnosis	Age (years)	Dosage	Results
Non-productive cough. Clinically normal. Afebrile	3	5 drops twice daily	Good
Coryza. Afebrile. Chest clinically normal	1/12	3 ,, ,, ,,	,,
Bronchiectasis. Changes in right lower lobe. Nephritis	5	5 ,, thrice ,,	Excellent
Non-productive cough. Rhonchi in right lower lobe	4	5 ,, ,, ,,	Good
Dry cough. Clinically normal. Afebrile	4	5 ,, ,, ,,	,,
Dry cough. Clinically normal. Afebrile	2	5 ,, twice ,,	,,
Bronchitis. Diffuse signs in chest	8	5 ,, thrice ,,	,,
Non-productive cough. Clinically normal. Afebrile	8	5 ,, ,, ,,	,,
Non-productive cough. X-ray: '? hilar glands'	2	5 ,, twice daily	,,
Coryza. Afebrile. Chest clinically normal	2	5 ,, ,, ,,	,,
Non-productive cough. Clinically normal	6	5 ,, thrice ,,	,,
Non-productive cough. Clinically normal	4	5 ,, ,, ,,	,,

TABLE I.—Results obtained with 'detigon' in 12 children.

Method of administration and dosage.—The drug is supplied in 10-ml. or 20-ml. containers which have a dropper mechanism built into the neck of the container and the container is inverted for the drops to be counted out. All patients were advised to take the drops in water or other suitable vehicle. The dosage range in the trial was from 5 drops twice a day for young children to 40 drops three times a day for adults. One millilitre (or 35 drops) contains 50 mg. of the drug.

RESULTS

In children.—As will be seen from table I, these were uniformly good, particularly in the patient with bronchiectasis in whom I had tried many

anti-tussive remedies in the past, without success. The drops were given in orange squash, lemonade or milk, and were well taken by all the children. No side-effects of any type were observed among them.

In adults.—Pneumoconiosis and chronic bronchitis are common in this area and many patients have really troublesome and severe coughs and have already tried almost every known cough suppressant. The use of 'detigon' in these patients was therefore a good test of its potency as the patients were able to compare it with previous remedies they had tried over the years.

The first twelve adults were treated with 20 drops three times a day, and the results are summarized in table II. The second patient in this series

Diagnosis	Age	Results
Tracheitis	43	Good
Pneumoconiosis	60	No effect
Laryngitis and influenza	29	Good
Chronic bronchitis and emphysema	65	Good
Laryngitis and influenza	22	Good
Non-productive cough. Clinically normal	65	Did not return
Pneumoconiosis	35	No effect
Pneumoconiosis	50	Good
Laryngitis	20	Good
Tracheitis	62	No effect
Chronic bronchitis	74	Fair
Pneumoconiosis	48	Good

TABLE II.—Results obtained with 'detigon' (30 drops thrice daily) in 12 adults.

had pneumoconiosis and a very wheezy chest. Although he noticed no improvement in the cough, there was a distinct improvement in the wheezing. No side-effects were observed on this dosage. The next 18 patients were given 40 drops three times a day, and the results are summarized in table III. From these two tables it is clear that the results were most satisfactory. Only three patients—all on the smaller dose—reported no improvement in their cough. All the others were most pleased with the improvement in their cough.

SIDE-EFFECTS

On the larger dose—i.e. 40 drops thrice daily—the following side-effects were encountered.

Sensation of trembling and apprehension.—Three patients (cases 1, 7 and 12 in table III) all reported sensations of trembling and of feeling rather agitated and apprehensive when taking 40 drops three times a day. These symptoms disappeared on reducing the dosage to 30 drops, three times a day. These symptoms suggest a central nervous stimulation.

Vomiting.—One patient (case 3 in table III) had some vomiting which disappeared after reducing the dose to 30 drops three times a day.

Urticaria.—One patient (case 14 in table III) developed a generalized urticaria when taking 'detigon' on March 16, 1960, and required treatment with antihistamines. On April 16, 1960, he was given 5 drops of 'detigon'

at 22.00 hours and developed no actual rash but had a generalized skin irritation. On April 26, 1960, he was given 15 drops of 'detigon' and then developed, in a short time, a very definite urticarial eruption on the lower legs. The rash was slightly hæmorrhagic. There can be little doubt that this patient is definitely sensitive to 'detigon'. He was not taking any other drug

No.	Diagnosis	Age	Results
1	Severe chronic bronchitis and emphysema	70	No improvement. Feeling of trembling and apprehension
2	Severe chronic bronchitis and emphysema	60	Very definite improvement in cough
3	Acute bronchitis	65	Definite improvement in cough. Dose reduced due to vomiting and possible sensitivity
4	Mitral stenosis	31	Satisfactory relief from cough
5	Advanced pneumoconiosis with progressive massive fibrosis	60	Excellent result and cough considerably improved
6	Early pneumoconiosis	54	Considerable improvement in cough
7	Chronic bronchitis and emphysema	59	Cough improved, but sensation of trembling
8	Chronic bronchitis	61	Considerable relief from cough
9	Chronic bronchitis	45	Good
10	Chronic bronchitis	61	Good
11	Mild chronic bronchitis	57	Good
12	Chronic bronchitis and pernicious anæmia	65	Good result but dose reduced due to sensation of trembling
13	Flare-up of chronic bronchitis	65	Excellent result
14	Chronic bronchitis and pneumoconiosis	55	Cough improved but definite urticarial reaction. Drug stopped
15	Advanced pneumoconiosis	60	Considerable improvement in cough
16	Moderate pneumoconiosis	52	Considerable relief from cough
17	Chronic bronchitis	64	Good
18	Moderate pneumoconiosis	45	Good

TABLE III.—Results obtained with 'detigon' (40 drops thrice daily) in 18 adults.

during these tests, and I visited his place of employment and could find no evidence of any material there to cause his skin lesions.

SUMMARY

(1) Details are given of a clinical trial of an anti-tussive ('detigon') in 12 children and 30 adults.

(2) The dosage ranged from 3 drops twice daily to 5 drops thrice daily in children, and from 30 to 40 drops daily in adults (1 ml., or 35 drops, containing 50 mg. of the drug).

(3) The results in the children were consistently satisfactory, and in my experience more satisfactory than with many other of the preparations on the market.

(4) All but three of the adults responded satisfactorily.

(5) Side-effects were encountered in five of the adults receiving 40 drops thrice daily, but in none of those receiving 30 drops thrice daily. It is therefore recommended that this latter dosage should not be exceeded.

(6) One case of allergic reaction to the drug was encountered.

Supplies of 'detigon' were provided by F.B.A. Pharmaceuticals Ltd., to whom I wish to express my thanks.

FOREIGN BODY IN THE RECTUM REMOVED BY OBSTETRIC FORCEPS

By A. P. MACDONALD, M.B., Ch.B.
General Practitioner, and Clinical Assistant in Surgery, Newark General Hospital

Although there are many reports of foreign bodies in the rectum and removal of these by various methods, the following case seems not without interest.

CASE RECORD

I was called to see a man aged 45 years. On arrival at the house I was met by the sister who said she had sent for me to see her brother who seemed very ill; that he had lost weight and had bleeding from the bowel but that he had refused to see a doctor so she had sent for me on her own initiative. When I arrived in the bedroom

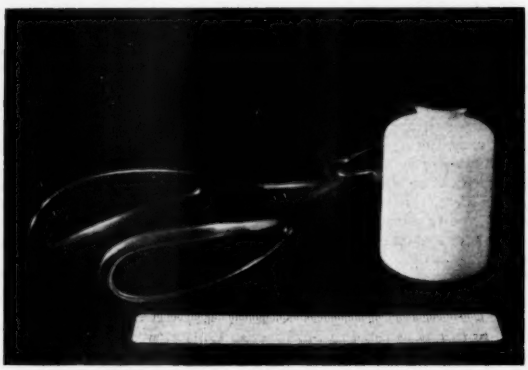


Fig. 1.—Glass bottle removed from the rectum, and obstetric forceps with which removal was effected.

the patient was up and dressed and was making his bed. He said that he had some abdominal pain, that he had lost some weight and that he had diarrhœa with blood in his stools. I examined his abdomen and could find little abnormal but as I had not a finger-cot with me I did not do a rectal examination. I explained to him, however, that in view of his history such an examination would be necessary. As he seemed quite able to attend my surgery I instructed him to report to me two days later for further examination.

The following evening I was again sent for by the patient's sister who said that her brother was 'in a stupor' and required an urgent visit. On arrival I found the man lying in bed with his eyes closed and he would only answer questions in an incoherent way so that I could get no history but, as examination of the cardio-vascular and nervous systems was negative, I formed the opinion that his symptoms were hysterical. On this visit, however, I had armed myself with a finger-cot and on digital rectal examination I was amazed to feel a hard object in the rectum which I concluded must be a bottle, base downwards. I at once arranged for his admission to hospital for treatment.

In the outpatient department he was given a general anæsthetic and I attempted to remove the bottle with my fingers—but without success. I then attempted to pass a piece of string up over the neck of the bottle but this, too, was unsuccessful. There seemed no instrument in the armamentarium of the surgical theatre to fulfil the

requirements so I decided to try straight short obstetric forceps. The blades were inserted one at a time as in obstetric practice and the shoulder of the bottle fitted into the fenestrations of the blades of the forceps so that they locked well. Slow and steady traction was employed and the sphincter gradually dilated to permit the delivery of the bottle (fig. 1), the base of which measured 2¼ in. (6.5 cm.) in diameter, whilst the distance between the blades of the forceps at their widest was 3⅛ in. (7.7 cm.).

The patient was admitted for observation in case any damage had been done to his rectum but he showed no symptoms and after five days he was discharged. Before his discharge I did a digital rectal examination and the sphincter did not seem unduly lax, gripping the finger in the normal way. At no time after the procedure described was there any loss of bowel control.

At a subsequent interview in the privacy of my surgery I gave him an opportunity to tell me how and why the bottle came to be in his rectum but he seemed rather reticent to discuss the matter so I did not press it.

SUMMARY

A case is reported of diarrhœa and rectal bleeding due to the presence of a glass bottle in the rectum.

AN EVALUATION OF 'PARABAL' IN GENERAL PRACTICE

By A. SLESS, M.B., B.Ch.

Brighton

We are constantly being bombarded by the pharmaceutical companies with a bewildering array of sedative drugs and tranquillizing agents, most of which purport to be a little more effective than the prescribed one. The majority of us have been repeatedly put on our guard against these new drugs because of the cost, undesirable side-effects and possible addiction. I am of the opinion that the best sedating agents are among the barbiturates but one cannot overlook the fact that they do cause both depression and hangover, which, although not serious, are very unpleasant and unwanted side-effects. To my mind the ideal sedative was one which would act in much the same manner as phenobarbitone, but without its toxic side-effects: in other words, a safe and predictable form of therapy without branching out to the synthetic tranquillizers.

SCOPE OF INVESTIGATION

Last year I was 'detailed' by a representative from a British company about a product known as 'parabal' which, and here I quote, was a 'detoxicated phenobarbitone': i.e. a barbiturate which was free from side-effects, less toxic and therefore more safe than the standard drug. The makers claimed that they had in effect made one-sixth of a grain of phenobarbitone equal, in therapeutic effect, to one grain of the standard drug with elimination of

side-effects. This effect had been achieved by producing a single molecular complex and not by the addition of central stimulants or antidotes. Each tablet contains 260 mg. of phenobarbitone sodium dihydroxyaluminium-aminoacetate, which is equivalent to 10 mg. (1/6 grain) of phenobarbitone sodium, combined with a glycine derivative.

There was no doubt in my mind that this new drug had many advantages therapeutically and its safety appealed to me. I therefore selected 11 patients, in whom some form of neurosis was the basic cause of their illness, to try the new drug on.

CASE RECORDS

Mrs. S.C., aged 33, lost her husband recently and is emotionally unstable. I prescribed two tablets of 'parabal' night and morning. There was a definite improvement after ten days and I then reduced the dose to one tablet thrice daily.

Mrs. V.P., aged 30, came to see me on account of premenstrual tension. She was of very nervous disposition. I prescribed one tablet of 'parabal' to be taken thrice daily during the two weeks preceding menstruation. She has now been on this treatment for three months with marked improvement.

I have used the same course of therapy in three other married women, aged respectively 20, 22 and 34, suffering from premenstrual tension. In all of them there has been marked improvement.

In four married women, aged 40, 42, 44 and 48 respectively, complaining of menopausal symptoms, but not of particularly nervous temperament, I have prescribed two tablets of 'parabal' twice daily. In all of them there has been relief of their symptoms, including hot flushes. They are now on a maintenance dose of one tablet twice daily.

Mr. F.T., aged 40, has hypertension, and showed no response to reserpine. I then prescribed two tablets of 'parabal' twice daily for a month, and then one tablet twice daily as maintenance therapy. There has been a slight improvement in his condition. Before treatment with 'parabal' the blood pressure was 170/102 mm. Hg. After three months on 'parabal' it is 160/96 mm. Hg.

A comparable effect was obtained in another male patient, aged 44, with hypertension. Following three months' treatment with 'parabal' his blood pressure fell from 160/100 mm. Hg to 150/90 mm. Hg.

In all these patients there was a complete absence of side-effects, notably the hangover and depression which are so liable to occur with phenobarbitone. All the patients readily accepted this new form of treatment.

CONCLUSION

Details are given of the response of 11 patients, all of whom had some form of neurosis, to a recently introduced drug, 'parabal', which is described as a 'detoxicated phenobarbitone'.

All the patients responded favourably, even when other forms of treatment had failed.

One of the most impressive features of this new preparation is the complete absence of side-effects and the ready acceptance of it by patients.

GENERAL PRACTITIONER CLINICAL TRIALS

A SINGLE-DOSE TREATMENT FOR THREADWORMS

PYRVINIUM EMBONATE ('vanquin') is the salt of a cyanine dye, which has anthelmintic properties, and has mainly been used in the treatment of threadworms. The main advantage of the preparation is that it can be given orally in a single dose.

SCOPE OF INVESTIGATION

For the purpose of this trial, 'vanquin' was supplied as a suspension and the dose used was 1 fluid ounce (32 mg.) for adults, with proportionate reduction for children (i.e. 5-10 years: ½ fluid ounce [16 mg.]; 1-4 years: 60 to 120 minims [4 to 8 mg.]). Since many cases of threadworms tend to recur at intervals, and since this may be due to reinfection in the home from other members of the family, it was decided, so far as possible, to investigate and treat symptomless members of the households in which the cases occurred. Where possible, two pre-treatment Scotch tape swabs and three post-treatment swabs were taken, these being obtained when possible early in the morning, when ova were most likely to be present. The post-treatment swabs were taken on the day after treatment, one week later and two weeks later. Unfortunately, it proved difficult to obtain patients' cooperation in collecting the necessary number of swabs, and in many cases patients defaulted after treatment, so that this information is not complete in every case. The swabs were returned 'blind' to the laboratory, being distinguished by a number or letter only, so that in the laboratory it was not known which swabs were pre-treatment and which swabs were post-treatment ones.

RESULTS

Results of the swabs.—Of the patients with threadworms who were treated with 'vanquin' 14 complained of having passed worms, and the other two were contacts discovered on routine swabbing. In addition, 22 contacts were also swabbed and of these, 14 were treated, although the pre-treatment swabs were negative. Thus, a total of 30 patients were given 'vanquin' and this was also given to one patient with roundworm infestation. A total of 61 pre-treatment swabs was taken, and of these 16 were positive and the remainder negative. In the patients complaining of threadworms, or in contacts with a positive swab, both pre-treatment swabs were positive in five, one pre-treatment swab was positive in three and the swabs were negative in nine. Despite the fact that negative swabs were returned from some patients, the diagnosis was quite definite, since the doctors themselves had seen the worms passed. It may be that the inability to find ova in these

swabs was due to the passage of time between collecting the swab and its receipt at the laboratory, through the post. All the patients who actually had threadworms and were treated, subsequently returned negative swabs after treatment, although in view of the number of negative pre-treatment swabs, it is doubtful whether reliance can be placed on these findings.

Clinical results.—Most of these patients were followed up for periods of three to four months, and of the 16 patients with threadworms who were treated, there was a recurrence of threadworms in only one during this period. This patient was given a second course of 'vanquin' but, nevertheless, threadworms still recurred at a later date, to be eventually cleared with a piperazine preparation. Side-effects were infrequent and 71 per cent. of the patients experienced no side-effects at all. Vomiting two to three hours after the dose occurred in four patients (13 per cent.) and, owing to the nature of the preparation, the vomitus was bright-red in colour. Red-coloured motions are also to be expected when using this preparation, and the patients should be warned about these possibilities beforehand, as otherwise this may be confused with blood.

CONCLUSIONS

Our conclusions were that this was a clinically effective treatment, of particular convenience in general practice since only a single dose is required. Some of us were, however, a little deterred at the possibility of alarming patients when vomiting of red material occurs, although this is perfectly harmless, and it sometimes proved a little difficult to explain this possibility to the patients. It was also concluded that the method employed for taking swabs in general practice and sending them through the post to the laboratory was unreliable and that the main criterion for cure of threadworms remains the clinical cure of the patient. Although this trial only uncovered two unsuspected cases of threadworms in families, it would seem to be desirable to treat whole families, when this does not cause too much trouble to the symptomless members of the families. A single-dose treatment such as 'vanquin' would appear to be particularly suitable for this purpose, since with preparations which must be taken over one or two weeks, doses are liable to be forgotten and the treatment therefore rendered ineffective.

The following practitioners took part in this investigation:—

Dr. B. L. Bisley, Twickenham, Middlesex
Dr. J. H. Davidson, Dulwich Village, London, S.E. 21
Dr. J. H. Stewart, Portsmouth, Hants.
Dr. D. Wheatley, Twickenham, Middlesex
Dr. D. G. Wilson, Bushey, Herts.

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SECTION OF GENERAL PRACTICE OF THE

ROYAL SOCIETY OF MEDICINE

DISCUSSION ON VERTIGO

January 18, 1961

Dr. J. A. Currie (*Cheshunt, Herts.*).—I shall consider 'epidemic vertigo' and report on some recent observations.

'EPIDEMIC VERTIGO'

The condition was first described by a Doctor Falconer in 1803 who, in reporting an epidemic which he thought to be influenza, said:—

'Vertigo and that to a considerable degree, was in some persons symptoms of the first signs of the disease and in several instances, very alarming and distressful. I saw a lady afflicted to such a degree as not to be able to raise her head from the pillow without losing all sense and to whom all objects appeared thrice multiplied'.

Gerlier, a Swiss general practitioner, in July 1886, noticed that the mildew on the vines appeared at the same time as an epidemic of vertigo.

His six patients, all shepherds, cowmen and workers in vineyards, usually got their symptoms in the afternoons rather than in the morning. He called this illness 'paralysing vertigo', and it occurred in the form of attacks, starting with a severe pain in the neck accompanied by vertigo, followed by ptosis and bowing of the head: paralysis of the extensors was Gerlier's description. Peasants driving carts would have to hold their eyelids open to see the way. The attack always ceased when the patient lay down, but few could afford to do this. In searching for a cause, according to the facilities then available, he considered fatigue, particularly when he found that the harvesters were working seventeen hours a day.

In 1925, Poston discussed the association of vertigo with encephalitis lethargica, which was present in acute epidemic form from 1915 to 1922. In 1936, Miller and Raven, at Ramsgate, described an epidemic of nausea, vomiting, and giddiness, not further defined. In 1949, Walford reported four cases in Essex which he thought might be epidemic, but last May he reported that two had subsequently developed multiple sclerosis, one a full Ménière's syndrome and in the other attacks of vertigo had persisted over the years.

In 1952, *The Lancet* described 'An unusual epidemic', stating that one doctor in Hampstead had seen six cases in January and had also diagnosed, in retrospect, three cases seen in March, April and October 1951.

The annotation went on to say that 'we had heard of three cases referred to a neurologist during the last few months and a single case seen by another general practitioner'. As a result, further cases were reported from widely spread areas, so it might be thought that an epidemic was in progress. At the same time, two housemen at the Radcliffe Infirmary, fell on the floor. In the course of a few weeks, reports from Britain ceased to come in, but a French doctor in Normandy also reported seeing a number of cases about the same time as those seen in England.

In 1954, Raffle and Yuille reported seeing a series of cases from the North-East Coast and Leishman reported six cases accompanied by diplopia seen

in the Rotherham area. In November 1955, Newell-Price, at an army physical training school, saw no less than 33 cases, whilst in 1956, Marshall, in Kent, saw six cases, one of whom had a fatal coronary thrombosis. Serial sections through his inner ear were all negative.

A RECENT 'EPIDEMIC'

In March and April 1960 I saw three severe cases.

The first was a housewife, aged 41, who had a sudden onset of acute vertigo, so severe that I transferred her to hospital where acute labyrinthitis was diagnosed, and she was not discharged for four weeks. Next, I saw a man of 54 similarly affected and by April 24 I had seen a further five cases; one of my six partners had seen two more.

There was giddiness on rising or turning in bed, described as: 'the room goes round as if I had had too much to drink'. There was no vomiting. On attempting to elicit nystagmus the more severe cases recoiled covering their faces, they reeled in their gait, but Romberg's sign was not grossly abnormal. I found walking heel to toe a more useful test. There were no associated auditory symptoms or signs; blood pressure was normal and only one patient was febrile.

Members of the College of General Practitioners were asked if they had encountered similar cases of acute vertigo during the previous six months, and were asked to report details of any cases seen in the future. Of a possible 387 doctors in the Thames valley, Middlesex, Bedfordshire, Hertfordshire and Essex area, 108 reported, and 32 reported on a total of 53 cases. Among the 48 cases which were finally studied the incidence was as follows:—

October	November	December	January	February	March	April	May	June
2	2	3	4	3	7	21	3	3

Arranging the cases in the order of date of onset, there was no obvious pattern of distribution. Cases occurred all over the area covered, during the peak period, mid-March to the end of April. The age-groups, 30 to 60, were most affected, but the range fell between 4 and 75. Diarrhœa and vomiting were also prevalent during the peak period, but otherwise there was only a background of chickenpox and measles, and in some cases no other disease was prevalent. Average recovery rates were between three and four weeks. Some recovered much more quickly. The boy aged 4 recovered in five days; we have, of course, no long-term follow-up in these cases at present. Treatment was with antihistamines or barbiturates in most cases, and an antibiotic as well in a very few. Some doctors gave no treatment. There was no evidence that the treatment given was of any value. No immediate contacts were reported to have contracted the disease.

DISCUSSION

I consider that this may have been a true mild epidemic, probably associated with gastroenteritis which was revealed through the epidemiological observation unit of the College of General Practitioners. It has been suggested, however, that this so-called epidemic was an artefact.

It is well known that sporadic cases of acute labyrinthitis occur from time to time,

and enthusiasm was set up by the questionnaire. People easily recollected cases which seemed to coincide with the condition, the finer details having been blurred over by time. Finally, is it surprising that there was a sharp rise of cases in April, when it is recalled that the questionnaire reached the practitioners concerned at the end of that month?

These are valid criticisms and must be met. Are these cases truly sporadic, or is this a disease of low infectivity always prevalent, which now and then breaks through? To see cases of a fairly unusual complaint in rapid succession, however, is unusual. Many of the reports received, giving careful clinical details, are impressive, and do not read like the work of 'enthusiastic journalists'. The dates spread would seem to be significant. The cases fall neatly round early April, and the dates were arrived at quite independently from one another. That epidemic vertigo occurs there can be no doubt and, as I see it, we had here a mild epidemic in which the resistance of the population was far greater than in some other epidemics described.

Mr. C. Gill-Carey (*Royal National Throat, Nose and Ear Hospital*).—Vertigo falls into four main groups: Ménière's disease, that associated with middle-ear disease, labyrinthine virus diseases, and the toxic action of certain drugs such as streptomycin. By far the commonest cause of vertigo is aural disease, although the pattern of attacks may vary. The violence of the attack depends not only upon the extent of damage to the end-organs in each internal ear, but upon the speed with which the damage has occurred. The non-anastomotic nature of the blood supply to the internal ear is the key to the selective nature of the attacks of vertigo in Ménière's disease. A single portion of the labyrinth may be damaged, or the whole internal ear, depending upon the site of the lesion in the vascular tree.

Ménière described four types of vertigo, and these apply to all cases of peripheral vertigo, whatever the etiology. True rotatory vertigo occurs without warning and without loss of consciousness, weakness or paralysis. The next two types consist of a feeling of unsteadiness and a feeling of vertical or lateral motion. In the last and most dramatic type, the patient is thrown suddenly and violently to the ground, and lies there vomiting. Differential diagnosis must exclude central nervous diseases, and the history is of great importance. In Ménière's disease, there is always associated deafness in some degree, and the caloric test is usually abnormal. The deafness is of a true end-organ type, characterized by recruitment of loudness, excessive sensitivity to loud sounds, differences in appreciation of pitch in each ear, distortion of sound, and fluctuation of the degree of deafness.

Associated middle-ear diseases may sometimes be difficult to diagnose and tests for a fistula in the semicircular canal and for positional vertigo may be useful. In the diagnosis of vertigo due to virus infection, aural and oral herpes must be searched for, in addition to cutaneous lesions. During streptomycin therapy, when giddiness or deafness is complained of, the drug must be stopped immediately. The damage is not always permanent and practically normal function can be re-established.

Dr. Denis Williams (*National Hospital, Queen Square*).—The neurologist sees many patients with vertigo, and it may be difficult to find the cause for the symptom. Clinically, the term includes any sense of imbalance, whether rotatory or not, and the sense of disequilibrium may be so mild as to result in the mistaken diagnosis of neurosis. True vertigo, rather than simply giddiness or faintness, must be due to disorder of the labyrinthine mechanism. The cause may be peripheral or central, and here I am considering only the latter.

CENTRAL VERTIGO

The differential diagnosis of these two causes may be difficult, since in each the vertigo may be intermittent, induced by movement or postural changes, and the subjective symptoms are the same. The associated symptoms will help in diagnosis, as exemplified by Ménière's disease, where there will be tinnitus and deafness. Central vertigo, on the other hand, may be accompanied by neural disturbances, such as diplopia and other visual changes.

Central vertigo in younger people may complicate neurological disease, such as multiple sclerosis, brain-stem tumours and head injuries. In elderly people, however, often no adequate cause can be found, and it is most important to inquire for visual changes. The attacks of giddiness may be associated with spots before the eyes and other symptoms such as tingling of the face, ataxia, leg weakness or loss of consciousness: the cause may then be vascular, due to narrowing or occlusion of the arteries supplying the cerebral circulation. These patients may have a blood pressure low for their age, and this may be inadequate for their needs. Apart from arteriosclerosis, we should look also for anæmia or recent dehydration: for example, as a result of diarrhœa. Cervical arthritis may also interfere with vertebral blood flow, and the vestibular nuclei in the pons are specially vulnerable to reduction in blood flow, due to their tenuous supply from the long lateral branches of the basilar artery. I have found 66 examples of this condition in the last thousand patients I have seen. If the varied, intermittent and dynamic nature of these syndromes, due to inadequate blood supply in the elderly, is recognized, we shall have a more rational basis for the management of many cases of vertigo.

MANAGEMENT

The symptom of central vertigo may be treated with sedatives, as for the aural variety. When the basic cause is arterial, however, there may be some conflict between general physicians wishing to lower blood pressure to safeguard the heart and kidneys, and the neurologists wishing to raise it to safeguard the central nervous system. Hypertensive drugs are best avoided, and bodily hygiene, exercise and weight gain will all help to maintain the level. Ephedrine or methylamphetamine may help, but it is most difficult to maintain a blood pressure by medical means. Anticoagulants may help to prevent final thrombosis, and seem to benefit some subjects. Measures to stop angulation of the neck, such as a foam-rubber ruff at night, may be of some benefit, but recognition of the nature of the symptoms is the most important measure in management.

CURRENT THERAPEUTICS

CLIX.—PAROMOMYCIN

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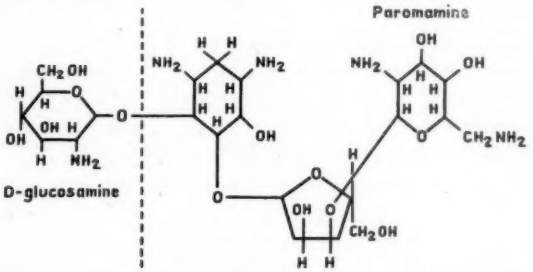
PAROMOMYCIN is an antibiotic prepared from filtrates of submerged, aerated cultures of the actinomycete *Stremtomyces rhimosus*, sub-species *paromomycinus*. It is closely related in many of its characteristics to streptomycin, neomycin and kanamycin. The probable gross structure is as follows (Haskell *et al.*, 1959):—



Haskell and his co-workers have shown that degradation of paromomycin releases two fragments, paromamine and paromobiosamine. Quantitative ammonia liberation studies indicate that the ribose and glucosamine moieties are glycosidically linked to adjacent hydroxyls in deoxystreptamine.

BACTERIOLOGY

Paromomycin is a white, amorphous, water-soluble powder with antibacterial activity *in vitro* against a variety of both gram-positive and gram-negative organisms, including *Staphylococcus* and *Streptococcus pyogenes*, *Escherichia coli*, *Aerobacter aerogenes*, *Salmonella spp.*, *Shigella spp.* and, according to Coffey and his colleagues (1959), *Mycobacterium tuberculosis*. In addition, Thompson and his colleagues (1959) state that it possesses powerful amœbicidal properties, with destruction of *Entamœba histolytica* in relatively low concentrations.

At Queen Mary's Hospital we have been particularly interested in the activity of paromomycin against gram-negative enteropathogenic bacteria. Results on freshly isolated strains occurring during 1960 are summarized in table 1. It will be seen that, despite its consistent activity against the shigella and salmonella groups, paromomycin is perhaps less constantly

potent against the more important *E. coli* serotypes associated with gastro-enteritis in infants.

Tests on organisms re-isolated from patients treated with the drug show that resistance does not develop in the case of *Sh. sonnei* or, apparently, with the salmonellæ usually responsible for food poisoning in this country (e.g. *S. typhimurium*). Drug resistance of a low order, however, has been

Organism	No. of strains tested	No. of strains sensitive to:				
		Paromomycin	Streptomycin	Neomycin	Chloramphenicol	Sulphadimidine
Shigella sonnei	41	41	37	41	–	4
Salmonella typhimurium	13	13	10	13	13	–
,, *para. B.*	3	3	3	3	3	–
,, *typhi*	1	1	–	1	1	–
,, *dublin*	2	2	2	2	1	–
,, *virchow*	1	1	1	1	1	–
,, *stanley*	2	2	2	2	2	–
,, *kiambu*	1	1	1	1	1	–
E. coli, type O.111	5	3	1	5	–	–
,, ,, ,, 055	13	13	3	12	3	1
,, ,, ,, 026	5	5	3	5	1	–
,, ,, ,, 0127	1	1	1	1	–	1
,, ,, ,, 0119	1	1	1	1	–	–

TABLE I.—Sensitivity of intestinal pathogens to paromomycin and other antibacterial drugs *in vitro* (the antibiotics were tested at 10 mcg./ml., and sulphadimidine at 100 mcg./ml.). Results of assays of organisms isolated from patients at Queen Mary's Hospital for Children in 1960.

found to occur with certain re-isolated strains of *S. paratyphi B* following more prolonged treatment with paromomycin.

The spectrum of activity of paromomycin is practically identical with that of neomycin but differs in some respects from that of streptomycin. The activity of all these drugs is, to some extent, bactericidal at levels (10 to 20 mcg./ml.) which are obviously easily maintained within the lumen of the intestine during oral medication. In view of their poor absorption it is doubtful if adequate levels can be attained in the bowel wall, the depth of mucosal crypts, or in the biliary tract where residual infection is liable to persist. This may explain the shortcomings of therapy in chronic carriers.

We have tested plasma from patients receiving maximal oral doses of paromomycin but have not been able to detect the drug in the blood. Small amounts (3 to 10 mcg./ml.) can be detected in the urine, proving that absorption has occurred, but it is obvious that the levels in the blood and

presumably in the tissues are far short of those required for effective antibacterial action.

TOXICITY

Our own experience with paromomycin and all recorded experience to date is confined solely to oral medication. The drug is well tolerated in doses up to 100 mg./kg. body weight daily in courses of up to ten days. Most observers agree that the main side-effects are nausea and some looseness of the stools on the second or third day of treatment. The latter may occasionally amount

	Number of cases	Failures
Treated with other antibiotics	67	40
Treated with paromomycin alone	13	1
Treated with paromomycin after failure of other antibiotics	25	6

TABLE II.—Comparison of results of treatment with paromomycin and other antibiotics in 80 cases of *S. typhimurium* (McMath and Hussain, 1959).

to diarrhœa, which occurred in six out of 20 carriers of *E. histolytica* treated by Bell and Woodruff (1960). Vertigo was reported in one patient by Miller and his colleagues (1960) during a second course of the drug, but this and the associated nausea cleared with suspension of treatment for two days. Dooner (1960) mentions slight abdominal pain occurring in eight patients among a group of 32 cases of chronic intestinal amœbiasis treated with paromomycin.

There are no reports of impaired hearing or of ototoxicity of the type associated with parenteral administration of the neomycin-streptomycin group of drugs, nor has there been any evidence of renal damage. All patients treated in the two series at Queen Mary's Hospital had their urine tested before, during and after therapy and in no case was any change attributable to the drug noted. Hæmoglobin and granulocyte levels are likewise unaffected.

Not infrequently, overgrowth of *Candida albicans* can be detected in the stools of patients receiving paromomycin. In a few instances this has resulted in the development of oral thrush but there are no reports of more extensive candidiasis.

SALMONELLOSIS

In the United Kingdom the first reported use of the drug in salmonella infections was by McMath and Hussain (1959). They carried out a trial in 38 cases of *S. typhimurium* infection, 25 of which had failed to clear up with other antibiotics. During the period of the trial they had under their care a total of 80 cases of the infection (excluding those in whom treatment or diagnosis was incomplete) all of whom, with the exception of six carriers, were admitted to hospital during the acute stage of the illness, mostly within a day of the onset.

Their results are shown in table II. Further analysis of these results showed that some of the failures with paromomycin therapy could be

attributed to inadequate dosage. The smaller doses were given at the beginning of the trial because there was uncertainty as to the amount of absorption of the drug which might occur in the presence of bowel ulceration. After the first 22 cases had convinced them that absorption was low and acceptable clinically they raised the dosage from less than 40 mg. per pound body weight daily (88 mg. per kg.) to between 40 and 75 mg. per

Dosage of paromomycin	Number of cases	Failures	
		No.	Percentage
Less than 40 mg. per pound body weight daily (88 mg. per kg.)	22	6	27
40 to 75 mg. per pound body weight daily (88 to 165 mg. per kg.)	8	1	13
25 to 75 mg. per pound body weight daily (55 to 165 mg. per kg.) with oral streptomycin, 1 g. daily	8	0	0

TABLE III.—Results of paromomycin treatment in 38 cases of *S. typhimurium* infection (McMath and Hussain, 1959).

Infection	Number treated	Cured	Not cured	Cured with another drug
S. paratyphi B	8	5	3	0
S. typhimurium	2	1	1	2

TABLE IV.—Results of paromomycin treatment in ten children who were convalescent carriers of salmonellæ (Coles *et al.*, 1960).

pound body weight (88 and 165 mg. per kg.). In addition they treated eight cases with a combination of paromomycin and streptomycin orally. These more detailed results of paromomycin treatment were as shown in table III.

In all these cases the diagnosis was confirmed bacteriologically and cure was defined as six consecutive negative stool cultures in a two-week period. Paromomycin was administered by mouth in six-hourly divided doses together with vitamin B complex. The length of the course of medication was not stated. No untoward side-effects were noted and in one patient, a lactating mother, paromomycin was not found to be excreted in the milk.

Courtney and his colleagues (1960) report the treatment of a family of five in Detroit suffering from *S. typhimurium* infection uneradicated after two-and-a-half months' treatment with other drugs. Four of the patients were cured by a five-day oral course of paromomycin in doses of 25 mg./kg. body weight daily and the fifth became bacteriologically negative after a second similar course. All the family have remained well and free of salmonella during a five-month follow-up period. They also quote the experience of Ross in a personal communication to them treating nine children with salmonellosis, seven of whom became bacteriologically clear after seven- to nine-day oral courses of 50 mg./kg. daily.

From Queen Mary's Hospital (Coles *et al.*, 1960) we have reported on the treatment of ten children who were convalescent carriers of salmonellæ. In all cases the dosage used was 40 mg. per pound body weight daily (88 mg. per kg.), bacteriological diagnosis was obtained before starting

treatment and the criterion of cure was four consecutive negative stools after completion of the course of the drug. The results were as shown in table IV. It is of interest that, on retesting the sensitivity of the organisms in the relapsing cases, *S. typhimurium* showed no change, whereas among the four re-isolated strains of *S. paratyphi B* partial resistance to paromomycin was detected.

In a further series we treated 23 cases and convalescent carriers of various salmonella infections (13 *typhimurium*, 3 *paratyphi B*, 2 *stanley*, 2 *dublin*, 1 each of *typhi*, *virchow* and *kiambu*), in a double-blind trial, giving paro-

Infection	No. treated	Cured after treatment with					Not cured
		1st drug		2nd drug		3rd drug	
		Neomycin	Paromomycin	Paromomycin	Neomycin	Framycetin or chloramphenicol	
Sonne	37	12	15	5	5	–	0
Salmonella	23	3	3	6	5	3	3
E. coli serotype	13	5	5	2	1	0	0
Totals	73	20	23	13	11	3	3

TABLE V.—Effect of successive courses of antibiotics in convalescent carriers of various intestinal infections (children aged 3 months to 12 years). Only those cases showing bacteriological clearance (i.e. at least four consecutive negative fæcal swabs) were regarded as cured.

momycin or neomycin to alternate cases on admission after a preliminary diagnostic stool examination. Cases relapsing bacteriologically were then treated with the other drug, i.e. a case originally receiving paromomycin which relapsed then received neomycin and vice versa. Cases relapsing after both drugs were treated with framycetin or chloramphenicol. This investigation (table V) showed that only six cases were cured by the first five-day course (3 of paromomycin; 3 of neomycin). Of the 17 children who remained infected, 11 were cured by a second course of treatment (6 of paromomycin; 5 of neomycin). Three children who were not cleared of infection by both drugs failed to respond also to framycetin and chloramphenicol. In these cases, as in other cases of gastro-intestinal infection reported by us, we have assessed cure only in terms of bacteriological clearance (four consecutive negative fæcal swabs, starting forty-eight hours after the last dose). This is important, as symptomatic response often occurs without bacteriological clearance and indeed, in this type of infection, spontaneously.

An instructive report of cure of a case of clinical salmonellosis of six years' duration has been made by Miller and his colleagues (1960). This concerns a woman who was infected with *S. bovis-morbificans* in June 1953 during an outbreak of food poisoning in Lancashire. The patient had continued symptoms with diarrhœa, fever, abdominal griping and weight loss. Numerous chemotherapeutic, antibiotic and other agents were administered during the illness with little benefit. In September 1958 she received a ten-day course of paromomycin (50 mg./kg. body weight daily) without eradication of the infection. A further ten-day course in February 1959 (in doses of 100 mg./kg. body weight daily) resulted in cure.

SHIGELLOSIS

Courtney and his colleagues (1960) described the effects of paromomycin therapy in an outbreak of *S. flexneri* dysentery among 160 inmates of a children's institution in the United States. About half of the children were treated with doses of 25 mg./kg. body weight daily and the remainder with 50 mg./kg. body weight daily, treatment continuing for six to seven days.

Type of case	Number treated	Cured	Not cured	Cured with another drug
Dysentery	9	8	1	1
Symptomless carriers	18	17	1	1

TABLE VI.—Results of paromomycin treatment in 27 children with shigella infections (Coles *et al.*, 1960).

Drug	Number treated	Cured	Not cured	Cured with another drug
Streptomycin with sulphonamide	56	46	10	8
Neomycin	5	4	1	1
Other drugs	6	3	3	2

TABLE VII.—Results of treatment with drugs other than paramomycin in 67 children with shigella infections (Coles *et al.*, 1960).

Only four patients from each group failed to respond promptly and in only two were shigella recovered on stool culture subsequent to treatment. They also cited a further seven children with shigellosis given oral paromomycin in doses of 50 mg./kg. body weight daily for seven to nine days, in six of whom there was bacteriological and clinical clearing of the infection.

Our experience at Queen Mary's Hospital (Coles *et al.*, 1960) in treating shigella infections in children with paromomycin has been encouraging and the results reported are shown in table VI. Cure was again regarded as having been attained when not less that four consecutive stools were negative for shigella on enrichment culture following the end of treatment. Paromomycin was administered orally in daily (divided) dosage of 40 mg. per pound body weight (88 mg. per kg.). These results compare favourably with those obtained with other treatments used in the hospital in the year immediately preceding the paromomycin trials (table VII).

In a further (double-blind) trial in which the effect of paromomycin was compared with that of neomycin (Stewart *et al.*, 1960) the results again showed that paromomycin had a favourable therapeutic effect though not significantly better than that of neomycin (table V). By treating those cases which relapsed after one drug with the other, all 37 cases were cleared of infection. This is in accordance with the bacteriological evidence that *Sh. sonnei* does not develop resistance to paromomycin during treatment nor is there cross-resistance to the closely related antibiotic neomycin.

AMŒBIASIS

There have been numerous reports describing the results of paromomycin used as an amœbicidal agent in the treatment of *E. histolytica* bowel

infections (Elias and Oliver-Gonzalez, 1959; Carter, 1959; Dooner, 1960; Bell and Woodruff, 1960; Moffett and Toh, 1960; Hugonot *et al.*, 1960). Many of these reports are well summarized in an article by Courtney and his colleagues (1960) (table VIII). They comment that these results give evidence that, in doses of 15 to 25 mg./kg. body weight daily for five days,

Number of patients	Number of patients examined and number negative on days after treatment began									
	1-7		8-14		15-30		31-59		60 and over	
	Examined	Negative	Examined	Negative	Examined	Negative	Examined	Negative	Examined	Negative
432	222	207	248	234	212	179	114	104	95	85

TABLE VIII.—Results of paromomycin treatment in 432 cases of intestinal amœbiasis (Courtney *et al.*, 1960).

paromomycin is very suitable for the treatment of most cases of chronic and acute intestinal amœbiasis.

In this country, Bell and Woodruff (1960) treated 20 carriers and found that 14 were cleared of cysts in three or four days. Nineteen of these patients were followed up for periods ranging from a month to one year and only one relapsed.

OTHER ENTEROPATHOGENIC ORGANISMS

Ross, cited by Courtney and his colleagues (1960), treated 17 children with infantile diarrhœa due to various serotypes of *E. coli* with paromomycin (50 mg./kg. body weight daily for seven to nine days). Of these 17 children, 15 showed prompt bacteriological and clinical response. There were two failures in whom *E. coli* type 0127 persisted after fourteen days of treatment.

In a series of 13 children with gastroenteritis associated with various serotypes of *E. coli* treated at Queen Mary's Hospital by the neomycin-paromomycin double-blind trial already described, 10 were cleared of infection by the first five-day course of neomycin (five cases) or paromomycin (five cases). The remaining three were cleared by further five-day courses of the alternative drug.

DISCUSSION

These various trials indicate that there are pre-eminently two types of infection in which paromomycin has a proved effect.

(1) Infections due to shigellæ of the Sonne and flexner groups, in which there is strong evidence of a consistent antibacterial effect in both acute cases and carriers. In dysenteric patients the acute symptoms subside rapidly within two or three days of the initiation of treatment. Immediate cure can be expected in a high proportion of cases: probably as high as, if not higher than, with any other single drug in comparable dosage. A certain number of these acute cases, however, are not cleared by the first course of treatment. As with other drugs, carriers are usually more refractory, but

even in these a reasonably high rate of clearance of well-established carriers can be expected. The results obtained at Queen Mary's Hospital suggest that a much higher clearance rate can occur when these carriers are treated successively with paromomycin and neomycin. There is no evidence at present that combination of paromomycin with another antibacterial drug confers any advantage in the treatment of shigellosis, although this possibility has not been adequately explored and might merit further attention.

(2) In amœbiasis there appears to be a powerful therapeutic effect in acute cases, according to reports from various centres throughout the world (Courtney *et al.*, 1960). Bell and Woodruff (1960) also conclude that paromomycin is an effective amœbicide in chronic infections but mention that ulcers in the large bowel may be slow to heal and that troublesome diarrhœa may occur in this condition during treatment. According to Courtney and his co-workers the beneficial effect of paromomycin is attributable to a direct amœbicidal action of the drug at concentrations as low as 2 mcg./ml. Bell and Woodruff are non-committal on this point and regard the results obtained *in vitro* as being inconclusive as yet. They concede that paromomycin is much more active against amœbæ than is neomycin but state that 'it is not yet known whether this effect is the result of a directly amœbicidal action or to destruction of the bacteria with which the amœbæ grow in symbiosis'. Although paromomycin undoubtedly exerts a beneficial action in intestinal amœbiasis there is no evidence, as yet, that it is superior to standard forms of treatment or to newer chemotherapeutic substances in this field.

In salmonella infections the results are less generally impressive. The preliminary trials by McMath and Hussain (1959) suggested that paromomycin might be effective in clinical infections due to *S. typhimurium*, especially when combined with streptomycin. Courtney and his colleagues (1960) also report encouraging results in the treatment of salmonellosis, and Miller and his co-workers (1960) obtained striking clearance in one case of prolonged active infection due to *S. bovis-morbificans*. Our own results do not entirely support this view. Symptomatic response and clearance do undoubtedly occur in many cases but the relapse rate can be over 50 per cent. when only one course of the drug is given, although a much higher rate of clearance (up to about 90 per cent.) is obtained when a second course of paromomycin or neomycin is given.

Our own results and those of Ross (quoted by Courtney *et al.*, 1960) suggest that paromomycin possesses activity against various *E. coli* serotypes associated with infantile gastroenteritis. There is, however, some variation in sensitivity of these serotypes to the drug and the results at present do not warrant any outright recommendation for its use in these cases.

The spectrum of antibacterial and therapeutic activity of paromomycin is therefore in many ways similar to the related antibiotics—streptomycin, neomycin and kanamycin. Cross-resistance can often occur between closely related antibiotics (e.g. the tetracyclines) but there is no evidence to date

that this imposes any serious limitation upon the activity of paromomycin. The results reported *in vitro* (table I) show that, whilst organisms sensitive to paromomycin are nearly always equally sensitive to neomycin, a proportion of these strains show resistance to streptomycin. Discrepancies between streptomycin and the other two occur with shigellæ, salmonellæ and *E. coli* serotypes, whereas the few discrepancies encountered between paromomycin and neomycin occur only among the *E. coli* serotypes. It is therefore important that indications for treatment, especially of carriers, should be based upon bacteriological tests, and that organisms re-isolated after treatment should be reassessed to exclude the possibility of drug resistance which has been shown to occur in infections due to *S. paratyphi B.*

SUMMARY

Paromomycin is a stable drug with a relatively wide range of activity against gram-negative intestinal pathogens.

Given orally in doses up to 100 mg./kg. body weight daily it is well-tolerated, non-toxic and poorly absorbed.

It has proved effective in the treatment of cases and carriers of shigellæ (Sonne and flexner), various salmonellæ and *E. histolytica.* For complete clearance of these infections more than one course of the drug is often necessary. It appears also to be useful in infections associated with certain serotypes of *E. coli.*

Paromomycin is remarkably free from serious toxic effects when given orally. It would appear that it ranks high in the list of drugs available for use in intestinal infections, especially in cases of amœbiasis, shigellosis and salmonellosis which have proved refractory to standard methods of treatment. The full potential of the drug has yet to be measured but, in view of its low absorption from the intestine and the absence of bactericidal concentrations in the blood, there is no justification for its use in typhoid or paratyphoid fevers, or other systemic illnesses due to salmonellæ.

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CALLING THE LABORATORY

XV.—BACTERIOLOGICAL EXAMINATION OF THE URINE

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Urinary-tract infections are common in clinical practice and bacteriological examination of the urine is necessary for confirmation of the diagnosis, control of chemotherapy and assessment of the results of treatment.

INDICATIONS

Obviously, patients who complain of symptoms referable to the urinary tract should have a urine specimen examined but it is well to remember that the symptoms of urinary-tract infection are not always typical. Some acute urinary infections present as pyrexias of unknown origin and some patients with chronic pyelonephritis complain only of vague ill health. Furthermore, some patients are specially liable to infection; diabetics, pregnant women and patients with obstructive lesions of the urinary tract fall into this group. Again, if a patient has to be catheterized it is wise to send a repeat clean voided specimen taken a few days later. Finally, all patients with confirmed urinary infections should be followed up bacteriologically for at least several months after apparently successful treatment. Relapse or reinfection may be clinically silent.

METHOD OF OBTAINING SPECIMEN

From men a carefully taken mid-stream specimen should be submitted for laboratory examination. The prepuce should be retracted, the glans penis washed and the middle of the urinary flow collected in a sterile container. In the past it has been customary to request a catheter specimen from female patients for bacteriological examination since voided specimens are usually heavily contaminated from the genitalia. Catheterization, however, carries the risk of introducing infection either from errors in aseptic technique or from contamination by bacteria lying in the urethra. The urethra itself is not sterile. The risk of developing infection after a single catheterization is estimated at between 2 and 6 per cent., and catheterization of a female patient merely to provide a specimen of urine for bacteriological examination can no longer be considered justifiable.

The alternative is a voided specimen taken in such a way as to avoid contamination. Numerous methods have been described for collecting such specimens, and have been shown to be satisfactory by comparing them with catheter specimens from the same patient and even with urine specimens collected by suprapubic needle aspiration of the distended bladder.

The methods of collection differ in detail but are similar in principle. The ano-genital region is thoroughly washed with soap and water and this cleansing may be followed by the application of an antiseptic such as benzalkonium chloride or chlorhexidine. With the labia separated, the patient then passes urine and a mid-stream specimen is collected. The use of a wide-mouthed container makes this easier.

If bacteriological examination only is required, 10 ml. of urine is sufficient. This should be ***submitted to the laboratory without delay***, for urine itself is a good culture medium supporting the rapid growth of most bacteria. The specimen, correctly labelled, should be accompanied by a request form giving relevant clinical details including any recent or current chemotherapy.

LABORATORY PROCEDURE

The procedure for bacteriological examination of the specimen is essentially the same in most laboratories. The urine is centrifuged and wet and gram-stained films are made from the deposit which is also inoculated on to blood agar and MacConkey agar plates. If the wet film, examined at this stage for pus cells, red blood cells and organisms, shows many bacteria a direct sensitivity plate is set up using discs impregnated with a sulphonamide, penicillin, streptomycin, chloramphenicol and a tetracycline. The following day the stained film and the cultures are examined. If the direct sensitivity plate has been omitted or if it cannot be read with certainty, another sensitivity test is carried out, using this time the isolated organism and not the urine deposit as inoculum.

INTERPRETATION

Pyuria is variable in urinary infections. It is always present and is often gross in acute infections but in chronic infections it may be minimal. Squamous epithelial cells and lactobacilli seen in urinary deposits from women indicate vulval contamination. Culture may yield no growth of bacteria, a growth indicating contamination, or a growth signifying infection. A scanty growth of several different organisms usually indicates non-pathogenic contaminants: e.g. *Staph. albus*, micrococci, diphtheroid organisms. A heavier growth of one or two bacterial species indicates infection and the types of organism isolated vary with the patient's history. In acute uncomplicated and untreated infections the growth is usually of a single organism which in some 80 per cent. of cases is *E. coli*. In chronic complicated infections the cultures often contain more than one organism and Aerobacter, Proteus and Pseudomonas species and enterococci are common. A clear relationship has been demonstrated between the *in vitro* sensitivity of the organism and the outcome of treatment in a large number of patients, and laboratory control of chemotherapy improves the chances of successful treatment substantially.

BACTERIAL COUNTS

The results of culture are not always clear-cut and in recent years studies of the actual number of bacteria present in contaminated and infected urines have been made. Counts to determine this are not difficult to perform. Known amounts of suitable dilutions of uncentrifuged urine are cultured and the numbers of colonies that develop are counted. When the colonies are well separated it can be assumed that one organism has given rise to one colony and the number of bacteria, expressed as organisms per ml., can be calculated.

When properly taken urine specimens are examined, contamination never produces more than 10^4 organisms per ml. and usually less than 10^3 organisms per ml. These counts, inconstant and varying from specimen to specimen taken from the same patient, represent bacteria from the urethra and vulva which have entered the urine during collection of the specimen. Infected urines contain more than 10^4 organisms per ml., almost always more than 10^5 organisms per ml. and often up to 10^8 organisms per ml. These high counts, fairly constant in serial specimens taken from the same patient, are the result of bacterial multiplication in the urine within the urinary tract.

A significant bacteriuria (counts greater than 10^5 organisms per ml.) can be found in the absence of symptoms or obvious pyuria.

Kass (1956) found asymptomatic bacteriuria present in 6 per cent. of 377 women and 4 per cent. of 102 men attending a medical outpatient department, and in 18 per cent. of 54 women and 5 per cent. of 37 men with diabetes mellitus; pyuria was demonstrated in less than half of these patients. Rengarts (1960) reported asymptomatic bacteriuria in 34 per cent. of 68 diabetic patients.

Some of these patients subsequently develop clinical symptoms of urinary infection and evidence is accumulating which shows an association between asymptomatic bacteriuria and pyelonephritis.

In a recent bacteriological survey of urinary specimens from pregnant women Kass (1959) estimated that 5 to 8 per cent. had significant bacteriuria and it seems that this is acquired before the second month: 44 patients fell into this category and they were divided into two groups. A control group given a lactose placebo showed an incidence of clinical pyelonephritis of 36 per cent. whereas there was no symptomatic infection in the other group whose bacteriuria was eliminated by chemotherapy. Treatment must be carried through to term otherwise the bacteriuria returns. Three months after delivery three-quarters of the untreated patients still had bacteriuria, whereas more than three-quarters of the treated patients had sterile urines.

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PRINCIPLES OF REHABILITATION

III.—HOISTS AND SLINGS

By W. RUSSELL GRANT, M.R.C.S., L.R.C.P., D.Phys.Med.

Director, Department of Physical Medicine, Royal Hampshire County Hospital, Winchester, and Winchester Group Agricultural Rehabilitation Unit

Much has been accomplished in the industrial world in the field of mechanical handling. Power can be used and controlled so that not only can steel girders of several tons be manœuvred easily and accurately, but delicate objects such as eggs and apples can be sorted and graded equally well by mechanical means without breaking or bruising. In most hospitals, however, the only recognized method of moving a patient is by one long thin nurse (with a 'disc') on one side of the bed and one short fat nurse on the other. When a handicapped patient returns home, even this poor method is no longer available.

The point of this was very forcibly brought home to me many years ago by the case of a heavy, heavily handicapped poliomyelitis patient who when asked how she got from her bed to her chair replied: 'It is quite simple; my father is a farmer and we get the farm labourers in and each takes a corner'. She was fortunate.

The usual problem is to lift a patient vertically, move sideways and lower. Patients with well-developed upper extremities and shoulder girdle muscles, even though paraplegic from the waist down, can manage this themselves, but there remains a large number of patients without the physical ability to do this, and in these cases, important though it is to provide the patient with a wheel-chair, I regard it as of equal importance to provide him (or her) with a means of getting into and out of the chair, and also from the chair to the water closet (w.c.) and bath.

HOISTS

Reasons for supplying a hoist.—(1) To enable handicapped people to become more independent by being able to get from bed to chair, chair to w.c., chair to bath, and vice versa without assistance (fig. 1, 2).

(2) To help a member of the household to lift and move the heavy helpless patient.

(3) To facilitate the moving and lifting of heavy helpless patients for nursing purposes.

There are three main classes of hoist:—

(i) Mobile
(ii) Attached to the ceiling and/or walls } using track
(iii) Attached to the bed }

(i) *The mobile hoist.*—This invariably requires the assistance of a second

person, both with the problem of the vertical movement and the horizontal movement.

(ii) *Those attached to the ceiling or walls* are limited in their sphere of action and in many cases present quite a problem in attaching the necessary tracks to a structure whose constituents may vary from steel girders to daub and wattle.

(iii) *Those attached to the bed* can be erected anywhere where there is room for a hospital-type bed with the wheel-chair beside it.

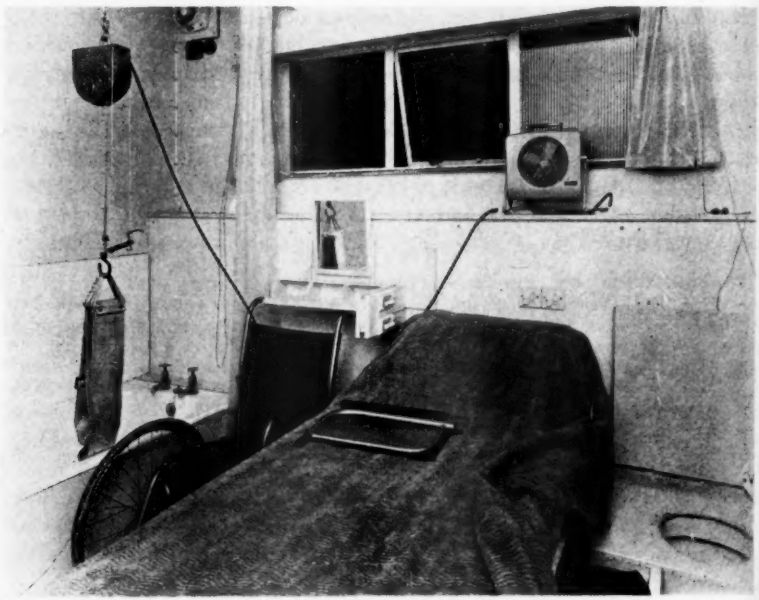


FIG. 1.—A specially arranged room with an electric hoist. Reading from left to right, this shows bath, chair-loading space, bed and w.c. Not visible is a piece of track running completely across the room to enable the patient when hoisted to travel to any of these sites.

In (ii) and (iii) both types of hoist can be operated by the patient and in the choice of hoists we have found that the ordinary industrial chain hoist is inexpensive, strong, reliable, and can be provided with the correct gear ratio. For the ordinary type of hoist a 5-pound pull (2.25 kg.) is required to lift 168 pounds (75 kg.). For those who have not the strength to provide this 5-pound (2.25 kg.) pull, or who, due to triceps or shoulder-girdle weakness, are unable to lift the arm, or due to grip weakness are unable to grasp the chain, it is possible to supply a fractional horse-power electric hoist on which the drum winds up a terylene rope. (It should be noted that terylene rope is vastly superior to flexible steel wire ropes since it

withstands being wound round a much smaller diameter drum and is not subject to the same amount of internal frictional wear as in the case of wire.)

The principle of the hoist attached to the bed (fig. 3, 4) has been in use now for some six years and we have found the ordinary overhead track for garage doors, with the appropriate internal wheeled trolley, to be adequate for providing the horizontal movement which requires very little effort. If the type attached to the bed is used for a patient to get from bed to chair, and bed to commode, this may give sufficient independence, but in many cases, provided the walls are adequate, we advise letting in a piece of water pipe over the w.c. and/or bath so that in the daytime the bed hoist or another small hoist can be used for these purposes.

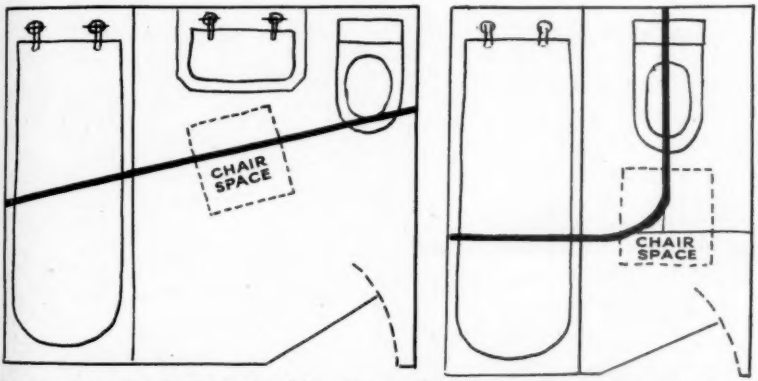


FIG. 2.—Line drawing showing: (a) a very usual bathroom arrangement with position marked out for track covering centre of bath, chair-loading site, and w.c.; (b) bathroom arrangement which requires curved track of 2-feet (60-cm.) radius.

Safety precautions when dealing with the electric hoist.—The hoist is kept up near the ceiling and is provided with an earth-free current from a 1 : 1 transformer, and the connexions for the hoist and switchings are insulated from the patient. A low-voltage motor can be used but is liable to more trouble due to burning a contact owing to the heavier current passed.

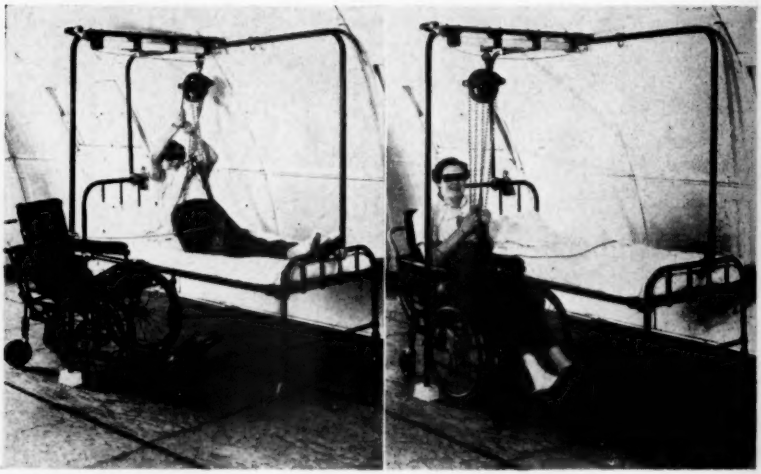
Cost.—This is very variable; most of the portable type of hoists vary between £55 and £75. The chain-type hoist used in industry costs just over £19. The electric hoist, using terylene rope, costs £54.

SLINGS

The problem of attaching the hoist to the patient has been the subject of a considerable amount of research and thought; it differs from the problems of industry owing to the fact that the patient cannot be provided with an umbilical ring bolt. Early experiments were carried out using various forms of parachute harness with special quick-release clasps and the like, but these produced features which in the main were the reverse of what

was wanted: e.g. they were very difficult to get into and almost too easy to get out of. Various types of sling were tried such as those resembling a deck chair, with or without apertures for toilet, but finally the solution was obtained from the Fire Brigade who told us that they used one canvas sling high up under the thighs and another slightly shorter one high up on the thorax under the arms. These were quick and easy to put on and did not require the patient to be lifted first, and when in position were perfectly safe.

Materials tried included chair webbing, nylon, sail webbing, terylene webbing and ordinary sailmaker's cotton webbing, but with many of these



(a) (b)

FIG. 3.—Bed-type hoist and track. (a) Patient about to hoist herself clear of the bed. (b) Successful completion of the manœuvre.

the edge of the selvedge produced discomfort and we found that the ordinary fire hose was the most satisfactory. This can be obtained in good condition second-hand from Fire Stations, and has been used for many years now. It can be used for bed and toilet purposes since during the latter it will clear the perineum, and if a second pair of slings is used, one can be set aside for use in the bath.

As an alternative method for getting people in and out of the bath, we sometimes use a 1-inch (2.5 cm.) mesh terylene hammock. This distributes the pressure fairly evenly, does not take gallons of water out of the bath as in the case of the canvas type, and can be dried quickly.

It is worth while mentioning that there is a further type of what we term 'personal slings' (fig. 5) which are worn under the clothes and are inconspicuous. This consists of two small slings of 4-inch (10-cm.) width made

FIG. 4.—Method of using hoist as an auxiliary nursing aid.

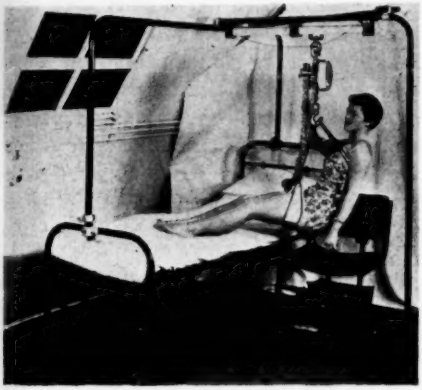


FIG. 5.—Personal slings in position. These, of course, are normally worn under the clothing.

of sailmaker's cotton webbing which are slightly longer than the circumference of the high thigh. To the ends of these is attached a small steel ring. This is a loose fit round the thigh but an insert of elastic serves to complete the circle round the thigh and keep the sling in position. One is worn as high as possible on each thigh. A third sling made of a strip of 4-inch-wide terylene is worn round the back and over the shoulder blades, emerging in the front under the axillæ where each end is fixed on to a $1\frac{1}{4}$-inch (3-cm.) steel ring. Across the front of the chest goes an insert of 1-inch (2.5-cm.) wide white elastic which holds the terylene sling in position. The patient can wear these all round the clock including the daytime as they are out of sight except when pulled through previously located slots either in the seams of skirts or trousers, or in the shirt or jumper of the wearer.

When using either of the above two methods of slinging a patient, it is vitally important to remember that the length of the upper trunk sling must be such that, once the person is slung, he is nearly sitting vertically before the pull comes on to the high-thigh slings. If this is not done, the thigh slings will tend to slide down the thighs and the patient will tend to jack-knife between the slings and will be very uncomfortable. This point is stressed because we have found that many people, particularly with the personal slings, have found them difficult to use owing to not taking this precaution.

REVISION CORNER

BELL'S PALSY

'You can already account for muscular motion I warrant, and explain the mystery of the brain and nerves—Ha! you are too learned for me d - - d me!'—The sarcastic surgeon, Crab, in Smollett's 'Roderick Random'.

In 1811, Sir Charles Bell in his 'New Ideas of the Anatomy of the Brain and Nervous System' noted:—

'On laying bare the root of the spinal nerves on touching the anterior fasciculus with the point of the knife the muscles of the backs were immediately convulsed'.

In his 1821 paper to the Royal Society on 'The Nerve of the Face being what is called the portio dura of the 7th', he observed:—

'The nerve goes off from the medulla oblongata and escaping through the temporal bone spreads wide to the face. . . . All the motions of the nostril, lip or face generally . . . depend solely on this nerve'. He continued: 'If an ass be thrown and its nostrils compressed for a few seconds so as to make it pant and forcibly dilate the nostrils . . . and if the portio dura be now divided on one side of the head, the motions of the nostril of the same side will instantly cease, while the other nostril will expand and contract in unison with the chest'.

Previously there was confusion between the functions of the 5th and 7th nerves, and Bell's book of 1830, 'The Nervous System of the Human Body', refers to a patient, who came to have his 5th nerve cut on one side of his face to balance the paralytic features of the other, and remarks that the patient 'would have been deprived of sensibility on one side and of motion on the other'. He recorded clinical examples of 7th nerve palsy such as a pistol ball entering the ear, a wound from an ox's horn under the angle of the jaw, suppurations in the ear, and inflammatory glands behind the angle of the jaw. So any lower motor neurone lesion of the 7th nerve can be called Bell's palsy, but over the years it has become conventional to reserve the term for facial paralysis of peripheral type and acute onset, for which no local cause is found. These cases are probably referred to by Bell as 'the Blight', when he says: 'It is frequent for young people to have what is called a Blight, by which is meant a slight palsy of the muscles of one side of the face, which the physician thinks is not formidable'.

ETIOLOGY

The etiology remains unknown. An unidentified virus has been suggested, perhaps activated by a draught: hence 'coach paralysis' from exposure of the cheek to cold winds on the stage coaches, or in motorists driving with an open window. Small stylomastoid foramina have been postulated in recurrent or bilateral attacks. Lesions proximal to the junction with the chorda tympani cause loss of taste on the anterior two-thirds of the tongue, and those proximal to the nerve to the stapedius muscle cause hyperacusis. A middle-aged woman recently had both these phenomena and until her recovery was distressed by the bark of her dog.

DIFFERENTIAL DIAGNOSIS

Old photographs are often a help in *congenital asymmetry*. Although facial palsy from *birth injury* usually recovers, I have seen it in an adult. *Hysterical glosso-labial hemispasm* produces a grimace with protrusion of the tongue to the side of the spasm. *Clonic facial hemispasm* usually affects older women. A doctor wrote to Bell to describe such a 50-year-old patient afflicted for nearly twenty years with 'an involuntary contraction of the muscles of the side of the face drawing up the angle of the mouth and

(a) (b)

FIG. 1.—(a) Geniculate herpes; (b) Patient trying to close eye.

giving a winking motion seen at a considerable distance'. I have seen this in an elderly woman, whose grand-daughter's imitative *tic* persisted into adult life. I have seen two cases of *facio-lingual hemiatrophy* causing loss of subcutaneous tissue of one side of the face and atrophy of the same side of the tongue, and one case of *facial-hemihypertrophy*.

Upper motor neurone lesions.—In these, forehead movement and eye closure are spared owing to bilateral central representation, but I recall a woman with Bell's palsy and hemiplegia on the same side who, looking in a mirror, diagnosed a stroke. Reassurance cleared up the hysterical hemiplegia immediately.

Central lower motor neurone lesions.—Tumours of the medulla oblongata are also likely to involve the 6th nerve, the medial lemniscus and the pyramidal tract. It is rare to get a lower motor neurone facial palsy in *multiple sclerosis*, although a 31-year-old woman had a right facial palsy, retrobulbar neuritis and left hemiplegia followed by a relapse with diplopia and paræsthesia after a three-year remission. I remember a baby with an apparent Bell's palsy, a mild febrile catarrh and slight neck stiffness, in whom virus studies confirmed *poliomyelitis*, and also a boy, who recovered completely from poliomyelitis except for a persistent left facial palsy.

Root lesions.—Tumours of the petrous ridge and cerebello-pontine angle, such as *auditory nerve tumours*, also involve the 8th nerve and often the 5th as well as the cerebellum. Seventh nerve palsy, usually bilateral, is common in *ascending radiculomyelitis* of the Guillain-Barré type. *Polyneuritis cranialis*, and also *gummatous basimeningitis* may involve the 7th nerve with other cranial nerves. I have seen a persistent partial bilateral facial palsy following

streptococcal meningitis which initially caused bilateral 6th and motor 5th palsies. *Traumatic lesions* are not as common as might be expected from the frequency of fractures involving the petrous bone.

Peripheral lesions.—In *herpes zoster* of the geniculate ganglion, described by Ramsay Hunt in 1906, the few vesicles on the pinna (fig. 1) and occasionally on the soft palate and anterior two-thirds of the tongue are often ignored by the patient. Initial pain is common, associated auditory and labyrinthine symptoms less so. The prognosis is somewhat worse than in Bell's palsy. The ear-drums should always be examined, although antibiotics have made *otitis media* and injury at *mastoidectomy* rarer causes of facial palsy. Similarly, *tuberculous* and *suppurative adenitis* are now uncommon causes, though mentioned by Bell. *Parotid tumours* involve the branched nerve fibres, and cause an initial blepharospasm followed by gradual spreading facial paresis.

PROGNOSIS

Recent work has altered the views on surgical treatment. It has been known for a long time that cases with partial paresis, or showing recovery within the first two weeks, make a complete or nearly complete recovery within two months. In others, more or less paresis persists. This corresponds roughly to the electromyographic (E.M.G.) finding of nerve degeneration in this latter group. In recent years reversible block lasting three to seven months has been recorded. Recovery from denervation must be by regeneration, but the E.M.G. may show active motor units after three to five months of paralysis and three months before signs of clinical recovery; this contraindicates operation, and suggests that successes attributed to decompression were often spontaneous recovery.

TREATMENT

As already mentioned, fear of a stroke needs reassurance. This necessity may be unexpected, as in a schoolgirl, whose mother had diagnosed a stroke but was afraid to mention her fears. The mother's relief was great, but the girl remarked: 'I told her it wasn't. I do biology at school!'.

Fears of disfigurement and the loss of emotional expression call for encouragement. Self-treatment by massage and exercises is of moral as well as practical value. When recovery is incomplete a placid expression promotes facial symmetry. At one time electrical treatment was thought to increase contracture, probably because the slowest cases to recover with the worst prognosis had most treatment. Galvanic exercise of denervated rabbit muscle, however, has been shown to diminish the amount of atrophy, and after re-innervation accelerates the return of its initial volume. It should therefore be used from the start when there is degeneration until voluntary movements return, though it is difficult to tolerate.

A retired Army officer after recovery said: 'This d - - d health service is no good, whenever I smile, I wink!'. Such crossed innervation, similar to

the Marcus-Gunn phenomenon, is attributed to regenerating fibres entering the wrong sheaths, but loss of insulation and 'shorting' of impulses between adjacent fibres is conceivable, as has been seen in spinal cord lesions. This might explain improvement attributed to stylomastoid canal decompression. Crossed innervation from the chorda tympani to the greater superficial petrosal nerve to the lacrimal gland causes crocodile tears on eating.

If strapping fails to prevent ectropion, tarsorrhaphy should be done, particularly in the elderly. After recovery it can be undone. There are several techniques of nerve grafting for cases with no recovery, and as a last resort plastic surgery can restore facial symmetry.

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Senior Physician, Metropolitan Hospital; Physician, West End Hospital for Neurology and Neurosurgery, and Royal National Throat, Nose and Ear Hospital

NOTES AND QUERIES

Dexamphetamine and Backache

QUERY.—A patient of mine in his mid-forties is subject to backache from an old crush fracture of vertebræ sustained over ten years ago. He has found that 5 to 10 mg. of dexamphetamine makes this pain much more bearable and enables him to carry out his work as a miner with no difficulty. Codeine or aspirin does not appear to be nearly so effective.

Now that dexamphetamine is obtainable only on prescription he must come to me for supplies. I do not understand why this drug should help his pain and am uneasy about the danger of addiction. Should I refuse point blank to give him any or would a small regular dose taken over many years be without danger?

REPLY.—This question is an extremely odd one and in abstract I find it very difficult to offer a satisfactory reply. The first point I would make is that old crush fractures of vertebræ do not, as a rule, produce late backache unless additional factors, especially psychogenic factors, are present. So far as I know, dexamphetamine has no direct pain-relieving action. It has a certain effect in delaying muscular fatigue, it does sometimes relieve spasmodic torticollis and, of course, has some useful action in Parkinsonism, but from its general effects and more usual actions there seems to be no obvious reason why backache should be relieved unless it is a symptom of depression, and this is the most likely explanation.

To use dexamphetamine as a long-term method of coping with mild depression is most unsatisfactory and is potentially dangerous. This is a habit-forming drug and, whilst habituation does not readily occur in stable subjects—for example in narcolepsy the same dose may be used for years without the necessity for an increase—I would advise against the continued use of this drug unless careful psychiatric examination of the patient provides evidence of stability and of the absence of depression. In such an event I would still consider more detailed consideration of the cause of the pain to be a wiser course than symptomatic treatment of this kind which, as the questioner says, is so rightly a matter which makes him feel uneasy.

WILLIAM PHILLIPS, M.D., F.R.C.P.

Hypertension and Diabetes Mellitus

QUERY.—I should be grateful for expert advice on the following problem:—

My patient is a female aged 67 years. She is a diabetic, well controlled on 16 units of zinc insulin suspension every morning. She has been subject to sudden very severe attacks of chest pain which start under the left costal margin, radiate across to the epigastrium, up behind the sternum to the shoulders and down to the fingers of both hands. During an attack, which lasts from two to three hours, and which comes on without warning and at rest, she is incapable

of speech and movement, is pale, cold and clammy and breaks out into a profuse sweat. Her radial pulse races and the jugular pulse beats synchronously. On the last occasion on which I saw her in an attack her radial pulse went up to 200 per minute, and her blood pressure was 140/110 mm. Hg. Morphine, ¼ grain (15 mg.), failed to relieve the condition and I gave another quarter grain in forty minutes. Her blood pressure was then unrecordable by the sphygmomanometer but was 60 systolic at the wrist.

The first attack occurred about six years ago and since then she has had one at intervals varying from three months to every two days. She has had three attacks in the last two weeks, the last one being the most severe and requiring hospital treatment.

Her blood pressure is normally in the region of 200 to 180/100 mm. Hg and one hospital has thought the diagnosis to be paroxysmal tachycardia with consequent ischæmic pain, and suggested she be treated with sedatives. Another hospital found no abnormal physical signs 'apart from a blood pressure of 200/90 and a single atrial ectopic beat on the electrocardiogram' and suggested 'strong reassurance as to the benign nature of her condition' and a trial of quinidine, 3 grains (0.2 g.) twice daily after a test dose. Neither of these suggestions has helped her.

REPLY.—It is assumed that in this hypertensive diabetic, pain and tachycardia always occur together. A heart rate of 200 usually means paroxysmal tachycardia, and ischæmic pain is readily induced by it, especially with coronary disease which is very likely to be present in view of the age, hypertension and diabetes. The associated symptoms of weakness, pallor, coldness and sweating are the result of a complex autonomic disturbance, pressor in the attempt to keep up the blood pressure despite tachycardia, and vagal stimulation as in angor animi. A marked fall of blood pressure is usual after morphine in the presence of a rapid arrhythmia. Phæochromocytoma should be excluded by estimation of catechol amines in the urine, and a hiatus hernia by barium meal.

Treatment.—It is vital for such patients to avoid hypoglycæmia from insulin and slight glycosuria is an important safeguard. As sedatives and quinidine in very moderate dosage have failed, double the dose of quinidine could be tried. Procainamide offers some hope for the prevention of attacks, 250 to 500 mg. thrice daily orally, and for an attack 250 to 500 mg. orally every four hours, or 250 to 500 mg. intravenously given slowly with sphygmomanometer control since induced hypotension can be abrupt. Procainamide is more likely to succeed in ventricular than in atrial paroxysmal tachycardia, hence an electrocardiogram taken during an attack would be useful in deciding how far to press the treatment. If atrial paroxysmal tachycardia were proved by an electrocardiogram, digitalis would be indicated, but in ventricular tachycardia digitalis is contraindicated until all other measures, including carotid sinus pressure, have failed and the patient is losing ground.

C. J. GAVEY, M.D., F.R.C.P.

Amœbiasis

QUERY.—(1) Is there any better drug than emetine or emetine bismuth iodide (E.B.I.) for use in a case in which *Entamœba histolytica* (pre-cysts—no flagellates or ora) and positive occult blood were found on stool examination?

(2) Are antibiotics or mixtures containing them of any value here?

(3) Can you suggest a good treatment regime if emetine or E.B.I. should be used?

REPLY.—(1) For intestinal amœbiasis there is no drug superior to derivatives of emetine. A patient with acute symptoms, usually associated with vegetative *Entamœba histolytica*, blood and mucus in the stools, should be treated by emetine hydrochloride parenterally for three days followed by oral gelatin capsules of E.B.I. for nine days. In the absence of acute symptoms the parenteral treatment should be omitted and E.B.I. be given for twelve days. (For details see Woodruff, A. W., *The Practitioner*, July 1959, **183**, 92.) It is important to make an accurate diagnosis, and reports which do not indicate that motile vegetative forms or characteristic cysts have been seen by a competent observer should not be accepted too readily as conclusive.

(2) and (3).—Antibiotics have some amœbicidal activity but are not recommended.

FREDERICK J. WRIGHT, M.D., F.R.C.P., F.R.C.P.ED., D.T.M. & H.

Determination of Sex

QUERY.—I have a patient who is expecting a baby in May and to whom it is rather important to know the sex of the child some time before the actual confinement. I should be grateful for any information you can give me as to how this can be done and where.

REPLY.—The sex of the fœtus *in utero* can be determined by study of the cytology of the liquor amnii. A sample of the latter can be obtained by abdominal paracentesis of the uterine cavity using a spinal needle, a technique with which most obstetricians are familiar. Such a procedure is best deferred until after the 30th week of pregnancy. The liquor sample is centrifuged and the sediment is stained by the Feulgen

or similar method. About 10% to 15% of all cells recovered are suitable for diagnosis by the pathologist, either on the percentage of cells with a chromocentre at any position in the nucleus, or, more quickly, on the percentage with chromocentres at the nuclear membrane. Sachs (*Brit. med. J.*, 1956, **ii**, 795) found a mean of 4% of cells with a chromocentre at the nuclear membrane in males and a mean of 35% in female fœtuses.

The paracentesis may be unsuccessful in that the placenta is needled and blood, not liquor, is aspirated. This is not harmful as a rule, but if the mother is Rh-negative and the baby is Rh-positive (which will not be known unless Rh antibodies have been found in the mother's blood) there is a possibility of Rh-isoimmunization being started or aggravated thereby.

I am not convinced that it is ever of great importance to know for certain beforehand the sex of the unborn child. Such foreknowledge might possibly encourage the pregnant woman to take unwise action, and in any case it detracts from the pleasurable excitement of a confinement. It might, at least theoretically, be of value in the case of a male sex-linked congenital abnormality whose detection and treatment at birth might be important.

S. BENDER, M.D., F.R.C.S., F.R.C.O.G.

'Port Wine Marks'

QUERY.—A young woman patient has extensive 'port wine marks' involving the greater part of both her legs and one side of the thorax. No other members of her family are affected in this way. She has asked what is the risk of any children she may have being similarly affected. I wonder if you can answer this query for me?

REPLY.—There is little risk of this type of 'port wine mark' being transmitted to the patient's children.

C. O. CARTER, B.M., M.R.C.P.

Loss of Libido in Primiparæ

QUERY.—I have two patients, young married women in their twenties, who have suffered from loss of libido since the birth of their first child. One has since had a second child, but with no improvement as regards her libido. Both of them had satisfying intercourse before they became mothers, and in both cases there has been no loss of affection between wife and husband. Neither of the wives has any fear of a future pregnancy, though I have just fitted one of them with a Dutch cap in the hope that this may improve things as she does not particularly want another baby just yet.

What is the cause of this condition, and is there any treatment for it? I should perhaps add that both are quite normal physically, nor do they show any evidence of endocrine disorder.

REPLY.—Loss of libido in women is a difficult problem and one to which there is often no easy solution. The whole question of sexual desire and satisfaction in women is extremely complex. Libido is often lost or diminished in the first few weeks after childbirth. The act of birth may itself render the sexual organs anæsthetic whilst perineal tears may remain tender for some time in spite of careful suturing. Also, during the first weeks or months, the mother is often tired and lacking sleep and finds it difficult to respond to her husband.

In the cases described, however, the disturbance would appear to be more profound and to require fuller investigation. Fear of pregnancy appears to have been eliminated but this may not be so in fact. There may be a fixation on the child, or over-anxiety on his behalf, so that the mother is constantly listening at night in case the child cries. Sometimes it is helpful if the couple have a little time together away from the child. This is not always a solution in the case of an over-fixated mother as absence from the child only leads to her constantly worrying about him and feeling guilty at having abandoned him.

Perhaps the best approach is to explain to the woman that her relations with her husband are the most important thing in her marriage and that a happy and complete marriage offers the best security for her children. She may need to do some re-thinking regarding her sexual life. A book which women find very helpful is 'The Sexual Responsibility of Woman' by Maxine Davis (Heinemann, 15*s*.). If after reading this, and after accepting the fact that this is a psychological and emotional, rather than a physical, problem, things have not improved, then the situation will require assessment by a psychiatrist.

JOSEPHINE BARNES, D.M., F.R.C.S., F.R.C.O.G.

Recurrent Ulcers in the Mouth

DR. DENYS LAING (*Limpsfield, Surrey*) writes:—With regard to Dr. Douthwaite's note on recurrent ulcers in the mouth (*The Practitioner*, December 1960, p. 820) I have found that one can cure these small, but very painful, ulcers in a few seconds by applying neat carbolic acid. This trick was taught me by my father: the method is to dip the untipped end of a match into the carbolic and to touch the ulcer with that. If you use a probe, the acid runs off and leaves a snail-track ulcer, and if you use cotton-wool on an applicator you cover too large an

area. I have never had to do it twice to one ulcer, so long as the ulcer bed is properly whitened.

Professor D. Noel Paton

LORD FERRIER writes:—As a nephew of Professor Diarmid Noel Paton who, indeed was to me 'in loco parentis' when I was a boy, I was most interested in your note about him in 'Fifty Years Ago' (p. 159) in your January issue. Especially do I remember his insistence on the necessity for research and the maintenance of a mind open to critical examination and re-examination of existing knowledge.

Incidentally, when I was in the army in 1918 and the 'flu epidemic struck my unit I wrote to him for advice and well remember his reply —on a post card (by return of post). It read as follows: 'The medical profession know nothing about what they call influenza. Alcohol is a preventive and, possibly, quinine'. I took my rum and a quinine tablet each day and the 'flu passed me by.

PRACTICAL NOTES

Oxytetracycline in the Common Cold

As the result of a clinical trial of oxytetracycline in the treatment of the common cold, R. Lockhart (*Health Bulletin*, January 1961, **19**, 12) expresses the view that 'the results suggest that this drug may be helpful in relieving symptoms and reducing time lost provided that treatment is commenced during the first twenty-four hours of symptoms developing'. The trial was carried out on 202 volunteers in three of the Scottish works of the British Aluminium Company during the period, December 1959 to April 1960. Volunteers were asked to attend for treatment only on the first day of symptoms appearing, and each person treated was given two troches, each containing 30 mg. of oxytetracycline, in the morning and evening for the first two days of the illness. Analysis of the results shows that 45% of the patients were cured in under five days, whereas the previous experience of the same group of 202 volunteers was that only 7.9% were cured within this period. Of the patients treated with oxytetracycline, 92% lost no time off work, whereas their previous experience was that only 72.7% had lost no time off work while suffering from colds. The importance of immediate administration of the drug if any beneficial effect is to be expected is shown by the fact that in 35 volunteers in whom treatment was only started after the lapse of twenty-four hours, there was no effect in 45.7%, the corresponding figure for those starting treatment immediately being 24.7%.

The Prevention of Migraine

AN 'impressively beneficial effect' in preventing vascular' headache is claimed for UML-491 (1-methyl-D-lysergic acid butanolamide) by J. R. Graham (*New England Journal of Medicine*, December 22, 1960, **263**, 1273) following a short-term study in 113 patients with various types of migraine headache. The drug acts by inhibiting the release of histamine as well as neutralizing certain effects of serotonin. A typical case was that of a male patient suffering from histaminic cephalgia, or 'cluster headaches', which are of short duration but of great severity accompanied by disturbances such as 'tearing, marked vasodilatation, engorged nasal mucosa, salivation and at times miosis on the affected side'. This patient had kept 'accurate headache data' for ten years and had usually averaged three to six days of headache a month. He had tried many different drugs without success, but a daily dosage of 6 mg. of UML-491 produced rapid results and he went eight weeks without a headache. Substitution of a placebo resulted in immediate return of headache which was eliminated by reintroduction of the drug. Results in patients with a 'mixed', or migraine-tension, type of headache were not so impressive. Dosage ranged from 2 to 20 mg. daily in divided doses. Side-effects were mild in 10% of the 113 patients, moderate in 10%, severe in 10%, and 12% were unable to continue treatment because of such effects. The most common side-effects involved the intestinal tract and none was of serious consequence. Large doses (20 mg.) were well tolerated by patients who could not tolerate ergotamine tartrate because of vascular difficulties, but in view of reactions in other patients with arterial disease it is suggested that the drug should be used with caution in such cases. UML-491 is at present undergoing trials in Great Britain, under the name of 'palerol', but is not yet available commercially.

Duodenal Ulcer in Childhood

IN a study of the records of the 109 infants and children with duodenal ulcer seen at the Mayo Clinic between 1930 and 1958, W. M. Michener and his colleagues (*American Journal of Diseases of Children*, December 1960, **100**, 814) note that in many patients under 10 years of age no

symptoms or signs typical of duodenal ulcer were found. Abdominal pain was 'the only common finding', it seldom bore any relation to food, seldom caused the child to cease activities, and in only 35 cases did it awaken the child during the night. Melæna, or 'other evidence of loss of blood in the stool prior to the diagnosis of duodenal ulcer' occurred in 22 of the children. A follow-up of 92 of these patients, extending up to 27 years after the first diagnosis, showed that 53 became asymptomatic within four weeks after the initiation of symptoms and had no 'further difficulty'. The remaining 39 patients had recurring symptoms attributed to the ulcer. Of the 35 patients in whom the diagnosis was made at ages 5 to 9 years, 12 (approximately 30%) had recurring symptoms compared with 24 of the 47 (approximately 50%) in whom the diagnosis was made at ages 10 to 14 years. At the time of the follow-up, 44 of the patients were aged 15 to 37 years. Of this group, 22 still had ulcer symptoms and 22 had been asymptomatic since the initial episode. This, it is said, 'suggests an even chance that a child having a duodenal ulcer will have ulcer symptoms when he becomes an adolescent or an adult'.

Diagnosis of Malaria

ATTENTION is drawn by Sir Gordon Covell (*Monthly Bulletin of the Ministry of Health and the Public Health Laboratory Service*, December 1960, **19**, 223) to the fact that 'under modern conditions of rapid transport, the occurrence in this country of primary attacks of malaria in subjects who have recently passed through or resided in malarious areas is more than ever probable'. He stresses that 'early diagnosis of malignant tertian (*P. falciparum*) malaria is particularly important, because in non-immune subjects the disease is likely to prove fatal in a high proportion of cases if specific treatment is unduly delayed'. 'Despite repeated warnings', he notes, 'reports continue to be received from time to time of deaths from malignant tertian malaria which could have been prevented by prompt recognition and early treatment. More often than not, failure in diagnosis is due to faulty preparation and staining of blood smears . . . Meticulous care in the preparation and staining of blood smears is therefore of the utmost importance'.

What is not generally realized in this country is that in the early stages of a primary attack of malignant tertian malaria the clinical picture is quite unlike that commonly associated with malaria. The symptoms are generally indistinguishable from those of influenza and other febrile diseases. The temperature rarely exceeds 102°F. (39°C.) and may be considerably lower than this; it is usually remittent, and if intermittent is rarely tertian. Rigors are exceptional and parasites may be so scanty in the peripheral blood as to be scarcely detectable even after prolonged search.

Hæmostatic Absorbable Gauze

A NEW hæmostatic absorbable gauze for use at operations in which capillary or slow venous oozing cannot be checked by a temporary pack has been found to be 'very efficient' by G. H. Jantet and C. Rob (*British Journal of Surgery*, November 1960, **48**, 270) who used it experimentally in 18 rats and clinically in 14 patients. In adult albino rats it was absorbed within five days from the subcutaneous tissues, the muscles and the peritoneal cavity, but not until two weeks from the liver. In man 'it appears to be well absorbed from the various sites, but the exact time required for full absorption has not been determined'. It became encapsulated when implanted in the liver in rats 'but this is probably only a temporary phase during its absorption'. Such encapsulation was not found in man, in whom 'no untoward local reaction occurred, except if implanted too close to the skin'. The gauze, which is made from oxidized regenerated cellulose, is 'strong and handles well', although 'after a few minutes in blood it tends to become a little adherent to the fingers and the instruments'. It can be used either as a hæmostatic pack or as small patches sutured to a bleeding area.

Transmission of Ringworm

FOLLOWING an outbreak of ringworm in a girls' residential school, D. W. R. Mackenzie (*Sabouraudia*, January 1961, **1**, 58) carried out an investigation to determine the extent to which the pathogen existed in non-living sites and its mode of transmission. The pathogen (*T. tonsurans* var. *sulfureum*) was isolated on 89 occasions, 52 of these being from hairbrushes or combs. Infection was also found on the surface of pillowslips and other bedclothes, floors and a curtain, as well as in the atmosphere in the vicinity of the beds of infected children during bedmaking. Adoption by the school staff of simple hygienic precautions and a more rigid supervision of the manner in which brushes and combs were used resulted in a marked suppression of extra-human infection. Although brushes and combs had originally been allocated to individual children, it was found that indiscriminate use of these was common. When this was controlled, and all brushes and combs had been treated with disinfectant, and the cupboards in which they were kept had been washed out with disinfectant, the incidence of infection in brushes and combs fell from 34.7% to 1%.

Similarly, more frequent laundering and replacement of pillowslips was followed by a decrease in infection from 38% to 1% over a 4½-week period.

Meprobamate in Geriatrics

'MEPROBAMATE is probably the safest and most useful of the tranquillizers, particularly as initial therapy, in the management of mental disorders of the elderly', in the opinion of J. Holden (*Scottish Medical Journal*, December 1960, **5**, 526), who reports his findings in 90 elderly patients who were treated with meprobamate as their routine form of sedation on admission to hospital. Satisfactory control of disturbed mental symptoms 'without unwanted daytime oversedation' was achieved in 61 patients (66%) although one-third of these required minimal doses of other drugs in addition. These 61 cases included senile dementia (38), arteriosclerotic dementia (11), schizophrenia (2), organic dementia (2), anxiety depressive states (4), senile psychosis (3), and 'miscellaneous' (1). Despite the advanced age and poor physical condition of the patients, and 'in sharp contrast to other patients admitted and treated with other tranquillizers', no toxic effects were noted and the general improvement was 'much more marked, with consequent decrease in the demands for care and attention by the nursing staff'. In 30 of the patients who improved on meprobamate the drug was withdrawn, and in all instances there was psychiatric deterioration which made great demands on the nursing staff and led to 'deterioration in the therapeutic atmosphere of the ward'. Withdrawal had a similar effect in patients on combined treatment, which showed 'clearly the additive effect of the two drugs and the way in which the coincident use of meprobamate allowed sub-therapeutic doses of other tranquillizing drugs to become effective'. A further advantage was that with meprobamate there is less tendency to drowsiness. Dosage ranged from 400 to 800 mg. thrice daily.

Oxyphenbutazone in Ocular Disease

SATISFACTORY results are reported by L. E. J. Werner (*British Journal of Ophthalmology*, December 1960, **44**, 755) from the use of oxyphenbutazone (hydroxyphenylbutazone; 'tanderil') in various forms of eye disease. All the cases treated had previously proved resistant to other forms of therapy. Of 13 cases of chronic iridocyclitis, two showed the same recovery rate as with previous forms of medication, four showed much better progress, and four showed 'rapid improvement, greatly in excess of that anticipated'. Of four cases of acute iritis, one showed the same recovery rate as with previous medication, and two showed rapid improvement. In the four cases of deep keratitis and the two cases of nodular scleritis in which it was used, 'its resolvent and analgesic effects' are described as 'remarkable'. In two cases of sarcoidosis its effect seemed identical with, or slightly superior to, that of corticosteroids. The view is expressed that 'the action of this drug in suppressing inflammation seems to be similar to that of the salicylates and corticosteroids, with certain probable advantages'. With what appeared to be adequate dosage (300 mg. daily), there was almost complete absence of toxic side-effects, and the drug could be continued safely for as long as twelve months. In an addendum it is reported that 23 further cases of uveitis, scleritis, and deep keratitis have been treated 'without appreciable side-effects, and with disappearance of inflammatory manifestations in all of them'.

Uric Acid Stones

'A URIC acid stone must always be considered in the diagnosis of a patient with a history suggestive of stone where no opacity is evident on x-ray. Especially is this so if he is known to have habitually a diet rich in purine bodies, or perhaps if he has had ulcerative colitis'. These are two of the conclusions reached by A. W. Badenoch (*British Journal of Urology*, December 1960, **32**, 374) in a survey of 21 cases. There was only one female in the series, which included five cases of ulcerative colitis, four of whom had had a partial or total colectomy and an ileostomy, and none of whom had a high serum uric acid. The symptoms are similar to those of any patient with stone in the upper urinary tract. Diagnosis 'may be quite difficult', mainly because uric acid stones have the same radiographic opacity as the soft tissues. None of the cases in this series showed a shadow on plain x-ray. In all, the urine was acid and in most it was crystal clear and sterile on culture. Microscopic examination of a centrifuged deposit of urine revealed an excess of uric acid crystals in several cases—and this simple diagnostic measure is 'highly commended'. The serum uric acid should be assessed in every case. 'If raised it may be very suggestive, but is not always diagnostic and on occasion may be misleading . . . A reading above 6 mg. should suggest stone, with the appropriate history when a filling defect is seen in the pelvi-calycine system or ureter, but a lower reading does not exclude a calculus. The differential diagnosis of a filling defect in the renal pelvis or ureter on intravenous urography usually lies between a uric acid stone and a papillary neoplasm'.

REVIEWS OF BOOKS

Peptic Ulceration. By CHARLES WELLS, M.B., F.R.C.S., and JAMES KYLE, M.B., M.CH., F.R.C.S., F.R.C.S.I. Edinburgh: E. & S. Livingstone Ltd., 1960. Pp. 260. Illustrated. Price 42*s.*

ADDITIONS to the already voluminous literature on peptic ulcer must be looked at very critically both as regards purpose and content. The present monograph purports to be a 'Symposium for Surgeons' and the authors of the several chapters are, with one exception, present or former members of the Liverpool Medical School. As a review of the subject, it is, like the curate's egg, good in parts. The account of modern views on the epidemiology and the etiology are quite excellent, and Wellbourn's chapters on postoperative sequelæ are instructive and interesting. The sections devoted to surgical treatment are less satisfactory. Thus gastric and duodenal ulcer are lumped together as a single problem; the importance of quantitative assessment before and after surgery is ignored; and there are no follow-up studies to support the surgical recommendations. The account of pyloric stenosis is incomplete, and that of gastro-jejunal ulceration misleading. The operative illustrations are excellent, although some readers will be offended by the caption to figure 29, which refers immodestly to a Billroth-Wells gastro-duodenal anastomosis.

Surgeons, at whom the symposium is directed, will find little new to stimulate them, but practitioners will find the book sufficiently brief to provide them with an interesting survey of much current opinion. To those with a special interest in the subject the book will be useful for its bibliography, and the histological appendix is invaluable. The latter indeed is possibly the best thing in the book; it consists of translations of the original writings of Billroth, Pólya, Finsterer and others of the early pioneers of gastric surgery, and this is a luxury which would enhance the interest of many modern monographs. The book is beautifully produced.

Epilepsy and Related Disorders. Vol. 1, 2. By WILLIAM GORDON LENNOX, M.D., SC.D., and MARGARET A. LENNOX, M.D. London: J. & A. Churchill Ltd., 1960. Pp. 1168. Illustrated. Price 96*s.*

CAREFULLY conceived and admirably set out, this book traces the pattern of knowledge and belief of the nature and significance of epilepsy from Hippocrates to the present day. Writing upon the firm foundation of an immense amount of personal observation, the authors have produced in these two volumes what must become the major authoritative work on epilepsy. Their classification is clear and concise and the descriptions of various types of seizure likewise. The reader is at once made aware of epilepsy as a symptom rather than a disease—a symptom either of predisposing dysrhythmia or of associated nervous disease. Of particular interest is the chapter upon borderlands of epilepsy which goes further than the well-known book by Gowers under the same title, in which syncope and certain types of migraine receive special attention. In the second volume a whole chapter is devoted to the attitude of the doctor toward the epileptic patient and great attention is also paid to the domestic and social implications of the disorder. Treatment is, of course, fully considered. The work ends with a very full bibliography of writings upon epilepsy.

These two volumes will inevitably be read by all neurologists but their excellence will most certainly bring readers from every sphere of medical science.

Office Diagnosis. By PAUL WILLIAMSON, M.D. Philadelphia and London: W. B. Saunders Co., 1960. Pp. 470. Illustrated. Price 87*s.* 6*d.*

THIS is an admirable book, beautifully printed and produced, and Dr. Paul Williamson, of Texas, who proudly describes himself as a general practitioner, is to be heartily congratulated. He goes through the body symptom by symptom, talking in an easy conversational style about his ideas, methods and conclusions, and using as sub-headings: 'Questions to be asked', 'General and special examinations', 'Changes with time', 'Pitfalls', and so on. He likes to make an estimate of the 'anxiety level' of each patient: 'For lack of a better scale I usually write my estimate in terms of temperature, like this: AL-100.4. If I see a patient with bizarre symptoms and find that I have constantly pegged him at AL-102, then strong suspicion is aroused'. But psychoneurosis 'is never diagnosed by exclusion', but only by positive evidence when it exists. 'Whether or not organic disease coexists is a matter for organic investigation', and he stresses, over and over again, the need for careful history. The illustrations, very simple line drawings, are excellent, and the index is good. In fact, general practitioners, particularly those entering upon their life's work, will be glad to have this book, not to read straight through, but to browse in after seeing a patient, and to compare notes with its talented author.

Pediatric Dermatology. By HENRY H. PERLMAN, M.D., PHAR.D. Chicago: Year Book Publishers Inc., 1960. Pp. 477. Illustrated. Price £6 15*s*.

THERE has long been a need for a comprehensive, well-illustrated textbook of skin diseases as seen in childhood, and Dr. Perlman is to be congratulated on meeting this need within a reasonable compass and his publishers for producing such a well-illustrated and clearly printed book. In thirty chapters the author covers the ground remarkably thoroughly, his views are sensible and orthodox on most topics, being obviously based on a wide experience, and the right emphasis is placed on the commoner and more important disorders. It should be read by all those who have to deal with children, from the student to the fully-fledged pædiatrician who should need no reminder that skin diseases are exceeded only by respiratory infections and may account for one-fifth of the morbidity seen at an infant welfare centre. The general practitioner will find it of the greatest help: a reliable guide in diagnosis (the well-chosen pictures are of particular merit here) and treatment. Although he may grumble at the price it is little more than his wife pays for a good perm! The trainee dermatologist who has no access to a special children's hospital will find it valuable, and his senior can also learn from it.

Clinical Physiology. Edited by E. J. MORAN CAMPBELL, PH.D., M.D., M.R.C.P., and C. J. DICKINSON, B.M., M.R.C.P. Oxford: Blackwell Scientific Publications, 1960. Pp. 530. Illustrated. Price 50*s*.

THIS book has been written by thirteen physicians and one surgeon, all of them of the younger age-group. Emphasis is on those parts of physiology which are of greatest importance in understanding the functional abnormalities encountered in the clinic and it is indeed noteworthy how much of this knowledge has been obtained by clinicians making their observations on human subjects. There are fifteen chapters which between them cover most of the systems, although it is interesting to note that the nervous system is not included. Each chapter deals first with normal and then with disordered function, after which there is an outline of the physiological principles underlying the various diagnostic and other tests used in clinical practice; finally, and of great utility, there is a section in which the application of the preceding principles in clinical practice is described and evaluated. The clinical application of physiological principles is a good deal easier in some fields than in others and the immediate value of the different chapters to the practising clinician is therefore somewhat variable. It is also true to say that it would at times be impossible to give a very detailed description of the relevant physiological knowledge in the short space available, and that there must therefore be either a high degree of condensation or an appearance of superficiality. These difficulties are inherent in the vastness of the subject and the editors have done remarkably well in selecting the most suitable topics for their purpose.

Many of the chapters are remarkably up to date, for knowledge of the type with which the book concerns itself is advancing so rapidly that more is inevitably gained in the interval between the completion of a chapter and its publication. The editors are to be congratulated on having so obviously coordinated to the maximum the style and the timing of all the sections in the book so that the delay in publication could be reduced to a minimum.

This book is one more demonstration of the fact that physiology and the related study of disturbances of function are the major factors which influence medical thinking today.

Occupational Diseases and Industrial Medicine. By RUTHERFORD T. JOHNSTONE, M.D., and SEWARD E. MILLER, M.D. Philadelphia and London: W. B. Saunders Co., 1960. Pp. 482. Illustrated. Price 84*s*.

THIS is an excellent and thoroughly up-to-date survey of a subject which is growing rapidly in importance and complexity. Both authors are widely experienced in the field, and many case histories from their files illuminate the exposition. The industrial scene in the United States differs in many ways from ours, and particularly so in the legal aspects, but on balance the resemblances are greater than the differences. One is perhaps reminded of the book's American origin by the style more than the matter. Professional writing in the States has a tendency to prolixity noticeable even to those accustomed to Civil Service English. The first quarter of the book discusses the practice of industrial medicine in general, and two noteworthy chapters deal with the placement of the handicapped and the diagnosis of industrial disease. The remainder discusses the occupational diseases under headings of the various noxious agents and under pathological groupings: e.g. the pneumoconioses and occupational cancer. The new pesticides and ionizing radiations are well covered. Simple explanations of the chemistry involved are useful in reminding the physician (and this reviewer) of how much he

has forgotten from his student days. Remarkably few slips were detected, but the sentence on page 184 'The compounds are those composed of one type of atom only and are called homocyclic' needs revision.

Extensive bibliographies are given at the end of each chapter but less than a dozen are from sources other than American and British. There is a useful glossary of industrial terms. Altogether this is a book which can be confidently recommended for the shelves of the industrial medical officer.

First Aid in the Factory. By LORD TAYLOR, M.D., B.Sc., F.R.C.P. London: Longmans, Green & Co. Ltd., 1960. Pp. 140. Illustrated. Price 9*s.* 6*d.*

THIS is an excellent book on a branch of first aid which differs from that normally taught, in that skilled help and transport are always quickly available. As a result the correct treatment may at times be somewhat different, and also some special accidents require more attention than that given in a first-aid manual. The subject-matter is clearly presented and well produced, but on the top of p. 56 one line has been omitted and one duplicated. The deformity due to intracapsular fracture of the hip may often not show as promptly as suggested on p. 58. In connexion with the danger from ingesting poisons (p. 82) it is worth mentioning that these can be picked up from cigarettes which have lain on a contaminated surface. The illustration of the rocking stretcher (p. 100) shows the head bent forward instead of extended.

The remarks on cetrimide might well be noted by all first-aid workers and so, very specially, should the note on the danger from poisons due to the action of heat on some chemicals used in fire extinguishers. The recent accident which involved over 70 people emphasizes the importance of this danger. Finally, the official name of the *National Formulary* (p. 125) is now the *British National Formulary.*

These minor points should be corrected in the next edition which should certainly soon be required, for it is a book which ought to be read by all instructors in first aid as well as all those actually engaged in industry. There are useful hints in it for every general practitioner.

Disc Lesions and Other Intervertebral Derangements. By E. J. CRISP, M.D., D.PHYS.MED. Edinburgh: E. & S. Livingstone Ltd., 1960. Pp. 158. Illustrated. Price 15*s.*

DR. CRISP is one of those rarities these days: the teaching hospital consultant who has risen to his present position from general practice. It is hardly surprising then that his book is particularly addressed to medical students and general practitioners. The book is divided into three parts, the first consisting of basic anatomy, physiology, mechanics and pathology. This is sound. The second or clinical section deals with the recognition of various disc lesions, their differential diagnosis and treatment. The final twenty pages (probably the best in the book) describe the author's technique of spinal manipulation and traction. This is concisely and clearly done and the line drawings by Mrs. Lewis are excellent. Whilst not pretending to be a textbook on spinal diseases this is altogether a valuable little monograph with a distinctly individual flavour. As such it can be thoroughly recommended.

Chemicals in Food and in Farm Produce: Their Harmful Effect. By FRANKLIN BICKNELL, D.M. London: Faber and Faber, 1960. Pp. 192. Price 12*s.* 6*d.*

THIS short concise book is apparently intended to 'set the heather on fire'. It should be very successful in drawing public attention to the increasing dangers of unnatural chemicals which find their way—by accident or design—into the food of the modern citizen. Altered fats, colouring and flavouring agents, emulsifiers, detergents, antibiotics, hormones, pesticides and herbicides all come under attack. The text is clearly and persuasively written in language that should be understood by any Member of Parliament. The author is a most skilful advocate of his cause, and the useful bibliography of nearly 300 references shows that his brief has been prepared with care. Yet some medical nutritionists may feel that as the enthusiasm grows, the case becomes overstated. It is difficult, for instance, to accept the bold assertion (p. 112) that 'congenital abnormalities, physical and mental, are mainly caused by alien substances added to food'. The author's belief in the importance of 'essential fatty acids' for man, and his moral objection to the wisdom of adding fluorides to water supplies as a means of preventing dental caries, are open to dispute.

The book is highly controversial, but can be recommended for good reading, provided that it is not taken too seriously.

Memories of a Doctor in War and Peace. By ISABEL HUTTON, C.B.E., M.D. London: William Heinemann Ltd., 1960. Pp. 348. Illustrated. Price 25*s.*

WHEN Lady Hutton entered the University of Edinburgh as a medical student in 1905, at the age of 17, the prejudice against women doctors was still strong, and their prospects for future

employment were far from bright. Lady Hutton, however, was not the least depressed and in these posthumous reminiscences she presents a vivacious account of her career. In many ways, the most interesting section is that dealing with her undergraduate career, and her pen-pictures of her teachers are often brilliant. Psychiatry was her specialty of choice but her entrance into this field was delayed by a long spell with the famous Scottish Women's Hospitals service in Serbia during the 1914-18 War. The account of her experience during this gruelling period is a masterly example of understatement.

Soon after her return to civilian life she took a risk which might well have ruined her reputation by publishing her now well-known book on 'The Hygiene of Marriage'. Fortunately the times were not too premature and she was accepted as a pioneer in this field of medical education for the public. From 1938 to 1946 she was in India with her husband, Sir Thomas Hutton, who ultimately became Chief of the General Staff there, and the account of her Indian experiences is as interesting as those of her student days. As a vignette of medical practice over the half-century which spanned the two great world wars, these reminiscences could scarcely be bettered. Free of venom and pettiness, they bubble over with a female illogicality and *joie de vivre* which no mere male could resist.

NEW EDITIONS

Recent Advances in Tropical Medicine, by Sir Neil Hamilton Fairley, K.B.E., M.D., F.R.C.P., F.R.S., A. W. Woodruff, M.D., F.R.C.P., and J. H. Walters, M.D., F.R.C.P., in its third edition (J. & A. Churchill Ltd., 50*s*.) is for all practical purposes a new book. As such it is a welcome newcomer as there is a dearth of good books on this subject. Between them the three authors have provided a balanced and commendably up-to-date review, which will be of outstanding value to both postgraduate students and those who are already in practice. Inevitably, when so much ground has been covered in such a relatively short work, individual reviewers are bound to be critical of occasional oversights or misplaced emphasis. Perhaps the most marked of the former is the complete absence of any reference to rehabilitation or orthopædic surgery in the management of leprosy. All in all, however, this is an excellent book and can be thoroughly recommended.

General Endocrinology, by C. Donnell Turner, PH.D., in its third edition (W. B. Saunders Co., 66*s*. 6*d*.) is designed for graduate students in science. It approaches the subject from the experimental and comparative points of view, and makes no attempt to cater particularly for medical readers; it will therefore have little place in a purely clinical context. The volume has the advantages and limitations of single authorship. The subject is dealt with comprehensively, the style is clear and the conclusions offered are as definite as present knowledge permits. Each chapter is followed by most generous references, and with few exceptions, for example methods of assay of urinary œstrogens, these are commendably up to date. These references should be a most valuable feature to any reader not familiar with the field.

Arthritis and Allied Conditions, edited by J. L. Hollander, M.D., in its sixth edition (Henry Kimpton, £7 10*s*.) contains, according to the preface, 19 'entirely new chapters', whilst 16 other chapters have been 'entirely reorganized and rewritten'. Between them, the 39 contributors provide an exhaustive summary of the available evidence on the subject. It has all the faults of the currently popular American multi-author textbook: lack of discrimination, fear of expressing an opinion, and pedantic style. It is therefore not a book for the novitiate. The specialist, however, will find it a most useful reference book—at least so far as American contributions to the subject are concerned.

Antisera, Toxoids, Vaccines and Tuberculins in Prophylaxis and Treatment, by H. J. Parish, M.D., F.R.C.P.ED., D.P.H., and D. A. Cannon, O.B.E., M.B., B.SC., D.T.M. & H., fifth edition (E. & S. Livingstone Ltd., 37*s*. 6*d*.).—Under its double authorship this new edition fully maintains the high standards set by Dr. Parish in the first four editions. Revision has been thorough and new chapters have been added on combined active immunization, immunization schedules in childhood, immunization for international travel, and personal medical records. The book remains, as it has since first published in 1948, essential reading for the general practitioner. The authors appreciate what the family doctor needs and have provided it.

Varicose Veins, by W. Rowden Foote and A. J. Dingley, third edition (John Wright & Sons Ltd., 63*s*.).—That three editions of this book have appeared in ten years is evidence that it is appreciated. Since the first edition in 1949 the surgical treatment of varicose veins has been pretty well standardized. Flush ligation and stripping are the orthodox procedure, and treatment by sclerosants has been dropped except for certain specific indications, outlined in this book. The writing is clear and the illustrations excellent, and the book can be recommended to those seeking detailed information.

NOTES AND PREPARATIONS

NEW PREPARATIONS

'BETNELAN' tablets each contain 0.5 mg. of betamethasone, which is said to have a higher potency and a greater anti-inflammatory effect than existing steroids, thus allowing lower dosage with less risk of side-effects. Other advantages are said to include the absence of salt-retention activity, a negligible effect on potassium balance, the fact that it does not cause mental depression or muscle weakening, and that it is available 'at a lower price dose-for-dose than any existing cortisone derivative'. Issued in bottles of 30, 100 and 500 scored tablets. (Glaxo Laboratories Ltd., Greenford, Middlesex.)

'NAVIDREX' tablets each contain 0.5 mg. of cyclopenthiazide, a new oral diuretic which is said to be 100 times more potent than hydrochlorothiazide, of which it is an analogue. They are said to be well-tolerated, to have a minimal effect on potassium excretion, and need only be administered once daily. Available in containers of 25, 100 and 500 tablets. (CIBA Laboratories Ltd., Horsham Sussex.)

'PERSANTIN' preparations contain a pyrimidopyrimidine compound, with the chemical formula: 2,6-bis-(diethanolamino)-4,8-dipiperidino-pyrimido-(5,4-d) pyrimidine. They are intended for the treatment of heart conditions characterized by coronary vasoconstriction, either alone or to potentiate existing treatment, and are said to be 'markedly more active as a coronary vasodilator than is theophylline', and to have no diuretic action. Available in 2-ml. ampoules containing 10 mg. (boxes of 5 and 25), as sugar-coated 12.5-mg. tablets (bottles of 30 and 200), and as 50-mg. suppositories (boxes of 6 and 50). Boehringer Products Division, Pfizer Ltd., Sandwich, Kent.)

'ZYNOTRACIN' ointment, each gramme of which contains 4.5 mg. of xanthocillin, 500 units of zinc bacitracin and 10 mg. of hydrocortisone B.P., is indicated in 'all the commonly occurring bacterial infections of the skin' and also for the treatment of superficial wounds and burns and for infections of the outer ear. Its action is said to be both antibacterial and anti-inflammatory. Available in tubes of 5 and 15 g. (Distillers Co. (Biochemicals) Ltd., Broadway House, The Broadway, Wimbledon, London, S.W.19.)

PHARMACEUTICAL NOTES

AMES Co., Division of Miles Laboratories Ltd., announce that they are once again marketing 'occultest' and 'hematest' reagent tablets. (Stoke Poges, Bucks.)

PHARMETHICALS (LONDON) LTD. announce that their address has now been changed to:—Victoria Way, Burgess Hill, Sussex. Telephone No.: Burgess Hill 2737.

E. R. SQUIBB & SONS LTD. announce that their fluphenazine dihydrochloride preparation, 'motiden', is now available in two additional forms: an elixir containing 0.5 mg. per ml., in bottles of 60 ml. with unbreakable plastic dropper calibrated to deliver 0.5, 1, 1.5 and 2 ml.; 0.25 mg. tablets in bottles of 25, 100 and 500. (Speke, Liverpool 24.)

FILM NEWS

School Health Service and *The Management of Diabetes at Home* are two new 16-mm. colour filmstrips in the 'Camera Talks' series. The former, consisting of 29 frames, was produced under the supervision of the Medical Officer of Health for Salford and will be available to all schools and health authorities. The diabetes filmstrip, consisting of 37 frames, was produced under the supervision of the Queen's Institute of District Nursing, in cooperation with Burroughs Wellcome & Co., and is designed to assist nurses in the care of the diabetic patient at home. It includes the technique of insulin injection, urine testing, and the symptoms and treatment of insulin reaction. Both filmstrips are obtainable from Camera Talks, 23 Denmark Place, London, W.C.2, price £2 12*s.* 6*d.* each, including teaching notes.

Emergency Splinting with Plaster of Paris (16 mm., colour, sound; running time 17 minutes) illustrates 'the safe use of ready-made plaster-of-Paris bandages as well as the well-known risks resulting from their misuse'. It is suitable for showing to 'all who may, in times of emergency, be called upon to save lives and limbs'. Available on free loan from the Medical Information Department, Smith & Nephew Ltd., Bessemer Road, Welwyn Garden City, Herts.

FORTHCOMING CONFERENCES

Methods and Organization in General Practice.—A postgraduate symposium and exhibition on this subject, organized by the Cambridge University Medical School and the East Anglia Faculty of the College of General Practitioners, will be held in Cambridge on Saturday, March 25, 1961. Details are obtainable from the Secretary, The Medical School, Tennis Court Road, Cambridge.

Metabolic Disorders in Clinical Medicine will be the subject of a three-day course arranged by

Professor R. A. McCance for the School of Clinical Research and Postgraduate Medical Teaching in the University of Cambridge. The course, which is open to university and hospital medical and scientific staffs and to registered medical practitioners, will be held from April 10 to 12, 1961. Full details and registration forms may be obtained from the Secretary, The Medical School, Tennis Court Road, Cambridge.

Psychosomatic Aspects of Neoplastic Disease will be the theme of the second international conference organized by the International Psychosomatic Cancer Study Group, to be held in Paris from August 27 to 29, 1961. Full details may be obtained from the United Kingdom representative, Dr. D. M. Kissen, Brookfield, Elm Walk, Bearsden, Glasgow.

ROYAL SOCIETY OF MEDICINE

THE next meeting of the Section of General Practice will be held on Wednesday, March 15, at 8.15 p.m., when the subject for discussion will be 'General Practice in a Changing World'. The opening speakers will be Drs. John Hunt, T. F. Fox and George A. Silver.

NEW JOURNAL

As its title indicates, *Sabouraudia*, the official journal of the International Society for Human and Animal Mycology, is dedicated to the memory of the famous French dermatologist, Raimond Sabouraud, whose brilliant researches, particularly those on ringworm, ensured him a place of honour in the history of mycology. The journal, the first issue of which is dated January 1961, is edited by J. C. Gentles, and includes articles by well-known authorities on such diverse aspects of the subject as 'Moniliasis in partridges' and 'The extra-human occurrence of *Tricophyton tonsurans* var. *Sulphureum* in a residential school', as well as book and film reviews and general news items. The publishers are E. & S. Livingstone Ltd., 15-17 Teviot Place, Edinburgh 1, and the journal will appear quarterly at an annual subscription of 80s. (or $12), post free.

BCG VACCINATION

ALTHOUGH it is not considered that a general extension of BCG vaccination to children between the ages of 10 and 15 is necessary, the Ministry of Health has announced that school-children of 10 years old and upwards may now be offered BCG vaccination when the local health authority considers that this is justified in its area by the risk of tuberculosis infection at a later stage in the child's school life.

FARMER'S LUNG

As 'farmer's lung' is the cause of at least one death a year and in other cases results in much loss of work to farmers and farm workers, the Ministry of Agriculture, Fisheries and Food advises all such workers to wear an efficient dust mask when handling dried mouldy hay or corn. Such material is likely to be fungus infected, 'particularly after a wet season as in 1960', and large numbers of spores are produced during the drying out process. These spores become airborne whenever the material is disturbed or handled, and breathing the dust can cause this condition, the first symptoms of which are breathlessness with cough, often accompanied by pyrexia. Such masks can be obtained quite cheaply from most chemists.

VITAL STATISTICS FOR 1960

PROVISIONAL figures for 1960 issued by the Registrar General show that the birth rate (17.1 per thousand population) was the highest since 1948 (17.9). The death rate was 11.5 per thousand population, compared with 11.6 in 1959 and 11.7 in 1958. Infant mortality was down again, the rate being 21.7 per thousand live births compared with 29.6 in 1950. Stillbirths were also down, with a rate of 19.7 per thousand total live and stillbirths, compared with 21 in 1959 and 21.6 in 1958.

THE OUTPATIENT PROBLEM

SINCE a survey carried out in 1956, there has been no general reduction in the time outpatients have to wait in Scottish hospitals, and no significant increase in the number of hospitals with appointment systems for all their clinics, according to a memorandum to regional hospital boards from the Department of Health for Scotland. Boards are informed that if less than 75% of patients are seen within half-an-hour, the reasons should be investigated. Further, 'in any clinic where there is not an appointment system the reasons for this should be critically examined, and the Board should allow the situation to continue only if there are compelling reasons'. What can be done is illustrated by the example of the hospital where the percentage of patients waiting over an hour was reduced from 18 to 1, and the percentage waiting from half-an-hour to one hour was reduced from 48 to 16, as a result of investigation by a work-study team.

POLIOMYELITIS IN U.S.A.

PRELIMINARY figures show that in 1960 there was a 64% decrease in paralytic cases of poliomyelitis, and a 61% decrease in the total number of cases in the United States, compared with the final figures for 1959. The preliminary total

of 3,277 cases in 1960 is the lowest figure since 1938, when 1,705 total cases were reported, and the 2,265 paralytic cases in 1960 is the lowest number recorded since the reporting of paralytic cases began in 1951. It is pointed out, however, that, when the paralytic status of the 354 unspecified cases in 1960 is determined, the final figure will approximate the previous low of 2,499 paralytic cases reported in 1957.

CONTAMINATED COCONUT

FURTHER evidence of the extent to which desiccated coconut is contaminated by salmonellæ is provided by A. B. Semple and his colleagues (*Med. Offr*, 1961, **105,** 59). Of 6,567 samples examined in Liverpool during the nine-month period, February to October 1960, 5.8% were contaminated in this way. These included 32 samples containing *S. paratyphi-B*, and 13 containing *S. typhimurium*. In one month (July), 13 of 875 samples (1.6%) contained *S. paratyphi-B*.

PRESCRIPTION FORGERIES

MORE people are forging doctors' prescriptions to get tablets, according to a report in the *Pharmaceutical Journal* (1961, **186,** 20) of a recent meeting of the East Ham Executive Council. All doctors in the area have been reminded of their obligation to initial any alteration of, or addition to, a prescription.

SURGICAL SEWING MACHINE

UNDER licence arrangements with the National Research Development Corporation, Messrs. Chas. F. Thackray, of Leeds, are marketing a 'stitching gun' which, it is said, 'has successfully completed clinical trials'. This new instrument is intended for the stitching up of arteries after operation, and has already been used successfully in over 30 major arterial operations. In these it 'has proved highly reliable and "dropping a stitch" is an unusual occurrence'. 'With an easy one-handed action' it 'relieves the surgeon of the concentrated and prolonged labour of inserting a continuous over-and-over stitch with a fine needle in a holder'. It is claimed that 'little practice is needed to familiarize a surgeon with its use'.

ANTENATAL FLUORIDATION

FOR five years Ellen Kent-Hughes (*Med. J. Aust.*, 1960, **ii,** 956) has been prescribing one sodium fluoride tablet (2.2 mg.) to all the pregnant mothers in her practice during the antenatal period. Over a hundred mothers have had this treatment, and the first children born under this regime are now 4½ years old. The results in these children are described as 'uniformly good . . . the teeth are regular and evenly spaced', and so far she has seen only one small cavity. In some families in which the older children have not had this treatment, they have 'shocking teeth', whilst the teeth of the younger children are 'perfect'. She is also giving sodium fluoride tablets to the children: 1.1 mg. up to the age of one year, and 2.2 mg. till the age of three.

SAFETY OF FLUORIDATION

'No deleterious action on the thyroid need be feared from the daily dose of 1 mg. fluorine advocated as a prophylaxis against caries', according to K. Hennig and H. Fritz (*Schweiz. med. Wschr.*, 1961, **91,** 79). This conclusion is based upon their findings in 26 men who had been working on an average for twenty years in a factory handling fluorine. Some of them already had mild or severe skeletal changes due to fluorine, but all tests of thyroid function—serum cholesterol, basal metabolic rate, and radioiodine uptake—were normal.

A NEW ANTHELMINTIC

THERE has recently been a miniature spate of new anthelmintics. A preliminary report has appeared on yet another—though there is no mention of its use in man. This is a pyridine compound, 2-(β-methoxyethyl)-pyridine, which, according to A. W. J. Broome and N. Greenhalgh (*Nature* (*Lond.*), 1961, **189,** 59), possesses greater activity against nematodes in mice than phenothiazine or a mixture of bephenium embonate and hydroxy naphthoate. It is also proving of value in sheep, cattle and other domestic animals. An unusual feature is that it is more active when administered subcutaneously than orally.

PUBLICATIONS

Lectures on the Scientific Basis of Medicine, Vol. 8, published by the British Postgraduate Medical Federation well maintains the standards of its predecessors. Whilst most of the lectures deal with current research problems—all, needless to say, of interest to the clinician—several are devoted to more practical problems. These include Dr. D. G. Evans on 'Vaccination against poliomyelitis', Professor Stuart-Harris on 'The adenoviruses and respiratory disease in man', Dr. R. E. O. Williams on 'Epidemic staphylococcal infections in hospitals', and Professor Scowe on 'Hyperoxaluria'. The opening chapter is an attractive essay on 'The influence of botany on health and disease', by Sir Edward Salisbury. The whole presents an admirable picture of the rapidly changing face of medicine, presented by experts who are all active participants in their particular field of

research. The only pity is that it is not possible to produce the book more promptly. (University of London, price 45*s*.)

Attenuated Infection, by H. J. Simon, M.D., PH.D., is a welcome corrective to the old concept, which dies hard, that infection is necessarily a harmful state of affairs. As far-sighted bacteriologists have noted for many years, and as is now being more widely accepted, infection may in certain conditions be a state of mutual benefit to host and parasite. Attenuated infection, in Dr. Simon's rather fanciful language, represents a state of peaceful coexistence; if it is upset, the host—whether man, animal, plant or bacteria—may be the first to suffer. His book provides a wealth of information on the subject, but unfortunately the presentation is didactic and uninspiring. In spite of this it is a book which should be studied by all clinicians. It puts the position in reasonable perspective and is well worth the effort required to wade through its circumlocutions and repetitions. (Pitman Medical Publishing Co. Ltd., price 80*s*.)

The 'Chemist and Druggist' Tablet and Capsule Identification Guide is accurately described by the publishers as 'an invaluable signpost to the identification of more than 900 tablets and capsules'. It consists of five coloured charts and two in black and white. These may be obtained in the form of a brochure (the most suitable for the practitioner) or as a set of eight cards. Every practitioner, as well as every pharmacist, is strongly advised to get hold of a copy. If the problem of identification could be simplified, these charts do it. (Morgan Brothers (Publishers) Ltd., price: brochure 8*s*. 6*d*.; set of 8 cards 17*s*. 6*d*.)

Side Effects of Drugs, compiled by L. Meyler, M.D., has now been issued in a third edition, which is said to cover the 'unwanted effects of drugs as reported in the medical literature during the period 1958-1960'. Actually there are more 1957 than 1960 references in the book, but this does not detract from the value of this useful, if depressing, compilation. (The Excerpta Medica Foundation, price 39*s*.)

Human Growth, edited by J. M. Tanner, M.D., is volume III of the symposia of the Society for the Study of Human Biology. It consists of the texts of six papers, and a summary of a seventh, read at a symposium, the date of which is not given. These deal primarily with such fundamental problems as 'description and modes of analysis of human growth', but others are of more general interest: e.g. 'effects of nutrition and disease on human growth'. (Pergamon Press, price 30*s*.)

Pergamon Press announce that their 'Catalogue of Scientific and Teaching Publications, 1961', is now available. (Pergamon House, 4 & 5 Fitzroy Square, London, W.1.)

OFFICIAL PUBLICATIONS

The Health of the School Child, the report of the chief medical officer of the Ministry of Education for 1958 and 1959, starts off on an optimistic note: 'Both in 1958 and 1959 the great majority of school children were robust and healthy. They were taller, heavier and cleaner than their predecessors'. Whether they were any happier or more contented is not stated. Physically their status was undoubtedly satisfactory. Only about 5% of them contracted a notifiable infectious disease. Poliomyelitis reached its lowest level for thirteen years, and tuberculosis continued to decline. Even on the physical level, however, our children are poised on a razor edge, as is shown by the recent outbreak of diphtheria, and constant effort and vigilance will be necessary to ensure that the now complex multi-immunization scheme is carried out to the full. (H.M. Stationery Office, price 10*s*. 6*d*.)

Safety Precautions in Schools. Ministry of Education Pamphlet No. 13, is a revised version of the pamphlet first issued in 1948. Whilst intended primarily for teachers, and students in training colleges, it has much of interest for general practitioners—particularly those who are medical officers to schools or other institutions for children and young people. (H.M. Stationery Office, price 3*s*. 6*d*.)

The Composition of Food, by R. A. McCance, C.B.E., M.D., F.R.C.P., F.R.S., and E. M. Widdowson, D.SC., in its third edition (Medical Research Council Special Report Series No. 297) is assured of a warm welcome. It is the most compact and easily consulted book of its kind, and is a veritable boon to all who have any association with nutritional or dietary problems. The new edition contains two new sets of tables—one giving the vitamin content of food, and the other the amino-acid content. (H.M. Stationery Office, price 30*s*.)

The contents of the April issue, which will contain a symposium on 'Genito-Urinary Disorders,' will be found on page A 142 at the end of the advertisement section.

Notes from the Continent see page 413
Fifty Years Ago see page 415.
World Health News see page A 15.
Motoring Notes see page A 101.
Travel Notes see page A 105.
Bridge Notes see page A 109.

NOTES FROM THE CONTINENT

A European Newsletter

BELGIUM

A new Rauwolfia ester.—The dimethylaminoethanol ester of reserpine, which has been synthesized by Professor La Barre and Dr. M. Gillo, is said to have certain definite advantages over reserpine. In a paper read before the Royal Belgian Academy of Medicine, they gave details of pharmacological experiments which showed it to be less toxic, and more hypotensive, than the natural alkaloids of *Rauwolfia vomitoria*. In addition, it has no action on the digestive secretions and no ulcerogenic effect—even in high concentrations. Further, in large doses it has a stimulating action on the central nervous system.

Prognosis in pituitary tumours.—In a series of 22 cases of hypophysial tumours undergoing surgical treatment, reported by Professor J. François and his colleagues, of the University of Ghent, the results were as follows: Improvement in 16 cases (72.7%), no change in 5 cases (22.7%), worsening of condition in one. There were two postoperative deaths. Discussing the factors affecting prognosis, it is noted that from the point of view of general prognosis, adverse factors are increasing age, evidence of vascular sclerosis, endocrine imbalance, a large tumour which exceeds the size of the sella turcica, impossibility of extirpating the tumour, and pressure on the optic nerve and chiasma. The factors suggesting a favourable prognosis are a small size of tumour, a tumour which is completely intrasellar, unaffected optic nerves and chiasma, and the possibility of instituting appropriate endocrine treatment.

From the point of view of vision the prognostic features are summed up as follows. Adverse factors are a long history, asymmetrical or unilateral disturbances in perimetry, lateral homonymous defects and bitemporal scotomas, optic atrophy and papillary stasis, and oculomotor paresis. Favourable prognostic factors for vision are a recent diminution of visual acuity, even though this is rapid and extensive, symmetrical bitemporal defects of the visual field, and the absence of optic atrophy.

The tuberculosis problem.—Although tuberculin surveys are resulting in a steady decrease in the number of tuberculin-positive subjects, there is still a hard core of infectious individuals in the community, according to M. A. Jeurissen, tuberculosis officer for Brabant. These are mainly old-age pensioners or chronic invalids who are either unaware of, or ignore, the risk they are to those with whom they come in contact. Two measures are recommended for dealing with this state of affairs. The first is the regular and adequately prolonged administration of antibiotics. The second is tightening up of controls by the payment of grants to those who take the necessary precautions and accept prescribed treatment, reinforced by the withdrawal of all pension rights from those who refuse to follow such advice.

GERMANY

Skiing accidents.—Whilst defective fastening of skis is a cause of many skiing accidents, ski-runs that are not up to standard are another common cause, according to W. Baumgartner. An investigation he reports shows that by adequate attention to ski-runs, and control of the traffic on them, the number of accidents can be reduced by one-quarter. On icy runs most injuries involve the head and upper extremities. About one-fifth of those injured reported that they had left the track. The introduction of safety-binding is hailed as the most useful prophylactic measure so far introduced. In this study, seven of the thousand injuries investigated were due to opening of the safety-binding.

Plaster of Paris and the circulation.—Although the temperature of a limb encased in plaster of Paris is lower than that of the unencased limb, opinions differ as to the state of the circulation in the encased limb. With a view to shedding some light on the subject, H. Schröder and H. Seyfarth measured photo-electrically the speed of circulation in a limb encased in plaster of Paris, and found it to be considerably increased. This, it is pointed out, is by no means indicative of an improved circulation; on the contrary, it probably means that the blood is less utilized than in the unencased limb. On the other hand, this increased circulation rate under plaster casts may well explain why thrombus formation under such casts is relatively rare.

Removal of tattoo marks.—Which technique (surgical, electro-surgical, mechanical, or chemico-physical) is to be preferred for the removal of tattoo marks depends upon the localization, breadth, and depth of the tattoo, according to H. C. Friederich. The aim of treatment, no matter which method is used, is the radical removal of the coloured particles introduced

into the epidermis and cutis—without disturbance of the affected skin. At the university dermatology clinic in Tübingen, surgical removal is preferred. Whether the tattoo is to be removed at one or more sessions, whether plastic surgery will be necessary, or whether a combination of methods must be used, is dependent upon the site and width of the tattoo, and can only be decided individually from case to case.

Myocardial infarction due to electric shock.—H. Zipp reports the case of a previously healthy 63-year-old man who received an electric shock when he grasped an electrified fence with his left hand. Normally, only a 6-volt current ran through the fence, but on this particular day the broken cable of a main light-conducting system had fallen in contact with it, so that the patient experienced a much stronger shock than that of a 6-volt current. He was thrown several yards, felt dazed for a short time, but did not lose consciousness. Later in the day, however, he experienced mild pressure in the precordium. This became steadily worse, definitely retrosternal in origin and radiating down both arms. A diagnosis of myocardial infarction was made the following day, and confirmed electrocardiographically. The patient recovered, but a year later had definite anginal symptoms.

Cold drinks and myocardial infarction.—Can ice-cold drinks cause myocardial infarction?—is the question that has been discussed recently in the German medical press. And the answer is apparently in the affirmative—but so also can hot foods. At least, reports have appeared of four patients, in three of whom myocardial infarction followed directly upon the drinking of an iced drink, and in the other after a hot particle of food stuck in the œsophagus. In none of these patients had there been any symptoms or signs of coronary insufficiency. It is suggested that in all these cases a reflex mechanism resulting in severe coronary spasm was the cause of the infarction. It is therefore recommended that older people—and especially if they have any evidence of coronary insufficiency—should not take either extremely hot or cold foods or drinks.

A radiotransmitter capsule.—A small radiotransmitter capsule (6 mm. in diameter) is described by H. G. Nöller, of the department of pædiatrics of the University of Heidelberg, which, it is claimed, can be swallowed easily, even by children, and permits the recording of gastric pH. It consists of a miniature detector, a transistorized transmitter and a battery. The electronic signals of the transmitter are recorded by a receiver outside the body. The 'electronic pill', as it is popularly known, is relatively inexpensive and need not be recovered. The amount of gastric secretion can be measured, as well as the free and combined acidity. In addition, acid-forming capacity, which is of considerable diagnostic significance, can be determined. As well as providing a wider range of data than the standard tube-aspiration technique for assessing gastric function, the results obtained are immediately available during the examination, permit a more precise interpretation of certain aspects of gastric function and save the patient even minor discomfort.

Fitness for air travel.—Fitness for air travel is reviewed by A. Kriebel. In cardiovascular disease there are in general no contraindications to air travel, provided the disease is well compensated during moderate activity. Neither is there any contraindication to air travel eight weeks after a clinically healed myocardial infarct provided cardiac function is reasonably satisfactory. On the other hand, patients with frequent attacks of angina pectoris should not travel by air, and the same applies for longer journeys to patients whose blood pressure readings, whether labile or stable, are over 200/100 mm. Hg. Neither patients with an artificial pneumothorax, nor those with emphysema, whose vital capacity is reduced to 50% of normal, should travel by air. There is no contraindication, however, to asthmatics flying provided they have no other conditions contraindicating this. Patients with a red cell count of less than 3 million per c.mm., especially if the hæmoglobin is less than 60%, should not be allowed to travel by air. It is a wise rule to ban air travel for epileptics. The decision as to how soon after an operation a patient should be allowed to fly must be based upon the merits of each individual case. In patients with a hernia there is always a risk of strangulation on decrease of air pressure unless a well-fitting truss is being worn.

There is no evidence of any connexion between air travel and abortion. Indeed, an air journey is less dangerous for a pregnant woman than any other method of travel, but the expected date of delivery should not be less than five days from the time of departure of the flight. Age, *per se*, is no contraindication to air travel, and healthy neonates stand up well to it.

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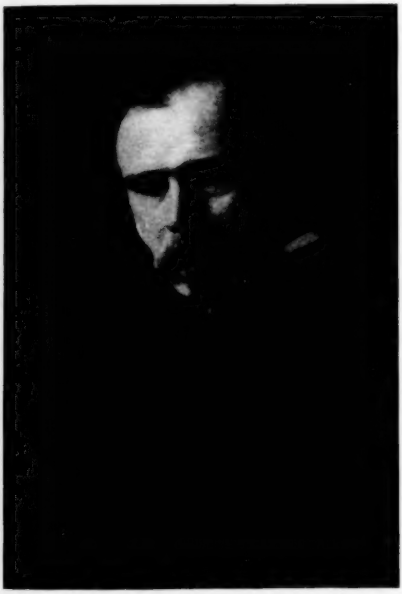
THE PRACTITIONER

Fifty Years Ago

'What is all knowledge too but recorded experience'.—Thomas Carlyle: *On History*.

MARCH 1911

IN his article on 'Cancer and the general practitioner' Sir Alfred Pearce Gould, K.C.V.O., M.S., F.R.C.S., Senior Surgeon and Surgeon in Charge of Out-patients, Cancer Department, Middlesex Hospital, writes: 'If *all* practitioners would make a practice of sending to the operating surgeon a brief record of every case of cancer that has been treated by operation,



Sir Alfred Pearce Gould, K.C.V.O., M.S., F.R.C.S. (1852-1922)

whether it show recurrence of the disease or not . . . the fact of the patient's death, and whether due to cancer or not, our knowledge of the real value of operations for cancer would soon become more clearly exact than it is at present'. 'One other service' he asks of practitioners, and that is 'the noting and public recording of every case of arrested or spontaneously "cured" cancer with which they meet'.

Born at Norwich in 1852, Alfred Pearce Gould was educated at Amersham Hall, Caversham, and after studying medicine at University College Hospital qualified M.R.C.S. in 1873 and M.B., B.S. in the following year with a gold medal and scholarships in medicine, surgery, and obstetric medicine. He obtained the F.R.C.S. in 1877 and proceeded M.S. with gold medal in 1876. He was assistant surgeon and lecturer in anatomy at the Westminster Hospital from 1877 to 1882, when he was elected assistant surgeon to the Middlesex Hospital. Dean of the Medical School from 1886 to 1892, he took charge of the Cancer Department on its formation in 1896. A member of the Council, Vice-President, and Bradshaw lecturer, he represented the Royal College of Surgeons of England on the Senate of the University of London. President of the Clinical Section of the Royal Society of Medicine, he was also President of the Medical Society of London, where as Lettsomian lecturer he dealt with diseases of the blood vessels.

His 'Elements of Surgical Diagnosis' was a valued work, and he contributed to Treves's 'System of Surgery', and was joint-editor of the 'International Textbook of Surgery'. A thorough, careful operator, he was insistent on the necessity of extensive removal for cancer, and keenly interested in radium treatment. A brilliant clinical teacher, he had a quick temper, but those who knew him well found him a good friend. He had a fine tenor voice, enjoyed fishing and gardening, and walking on his favourite Dartmoor.

E. F. Bashford, M.D., Director of the Imperial Cancer Research Fund, sums up his contribution on 'The obligation imposed upon the general practitioner by the development of the experimental investigation of cancer' by saying: 'Reasons have been given why the general practitioner should place confidence in the experimental investigation of cancer for, if it has not yielded a cure, or even so much as new means of alleviating suffering, it has at any rate provided him with that definite and well-established knowledge, which, if he will but lay it before his patients, must impress them with the truth that their only hope lies in the earliest possible removal of all lesions that have the remotest chance of being cancerous'.

Discussing 'Some points in the diagnosis and treatment of cancer of the breast', Hugh Mallinson Rigby, M.S., F.R.C.S., Surgeon to H.M. the King's Household; Surgeon to the

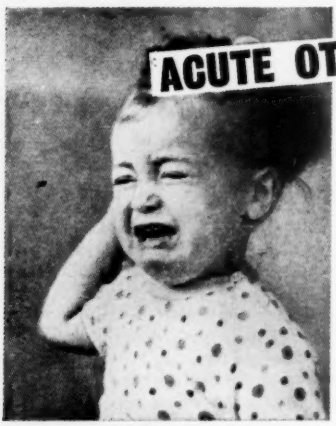
London Hospital; Senior Surgeon to the Poplar Hospital, contrasts the physical signs in the average hospital patient with those seen in private practice: 'I am afraid that in the average hospital patient these signs are only too definite. Unfortunately this class of patient comes for advice, as a rule, some long time after the trouble has first shown itself . . . in private patients a diagnosis of cancer of the breast is often a matter of great difficulty'. Of symptoms he writes: 'The popular idea that pain must be present prevents many patients from seeking advice until an almost hopeless condition has developed'.

In 'Some clinical uses of sodium salicylate', A. Campbell Stark, M.B., B.S., Late Demonstrator in Materia Medica at St. George's Hospital, writes: 'Most of the books on materia medica describe the action of the drug in acute rheumatism, but ignore its other uses, or dismiss them in a few contemptuous lines'. After referring to the drug's extreme solubility and rapid absorption into the blood, he deals with certain clinical applications. In the most common type of influenza, 'with a very sudden onset, severe headache, acute pain in the limbs, and a furred tongue, sodium salicylate is the best drug to use'. He describes its use in puerperal fever 'with most successful results' and calls it 'almost a specific' in the diarrhœa and sickness of young children. The rarity of nephritis in rheumatic fever, for which large doses are given for long periods, he says, makes it 'difficult to believe that there is any clinical evidence that the salt is obnoxious to the kidneys'.

Problems of diet occupy a large part of the article on 'Athletics and the medical man', by Adolphe Abrahams, M.R.C.S., L.R.C.P. Typical of his comments is the following: 'Observe the consternation with which men, whose stomachs could probably digest cast steel, eye a few inches of jam tart! Such forbidden aliments are avoided on the principle that respiratory power is obtainable from special articles of diet, an idea which realizes the extreme of absurdity when we are solemnly told that mutton is better than beef for wind and roast better than broiled!'.

J. D. Wynne, M.B., B.Ch., D.P.H., writing on 'Dr. Johnson and the medical profession', refers to the philosopher's fortitude during his last illness, citing the instance when he plunged a pair of scissors deep in the calf of each leg to relieve his dropsy, and how when being scarified, he urged the surgeon, 'Deeper deeper, I will abide the consequence: you are afraid of your reputation, but that is nothing to me'.

'Notes from Foreign Journals' includes one on 'A symptom of meningitis' in which Signorelli is quoted as saying that in meningitis a painful spot is always present, 'situated on the inner side of the upper end of the mandible, beneath the lobe of the ear and in front of the mastoid process. . . . Its existence can be discovered earlier than can the stiffness of the neck, or Kernig's symptom'. T. H. B.



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